July
949

Organic Gardening

25c

Gardening and Farming without Commercial Fertilizers

Order these 3 basic books by J. I. Rodale

1. STONE MULCHING IN THE GARDEN

A NEW invention in gardening! An authoritative guide to the use of stones and rocks for obtaining greater yields and healthier plants. This sensational but natural practice obviates such chores as digging, cultivating, hoeing, and weeding. Here is the most remarkable and promising cultural practice proposed in recent years. Cloth, 164 pp., 50 photos. **$3.00**

2. PAY DIRT

NEXT to the Atom Bomb, nothing else in the world is so serious as Man's ravishment of the earth that sustains him and keeps him from starvation. PAY DIRT points the way to proper farming and gardening methods, shows how the individual gardener can obtain bigger yields of disease-free plants, rich in health-giving qualities. A natural for everyone who wants to adopt organic gardening methods. Cloth, 252 pp. **$3.00**

3. The Healthy Hunzas

A BOOK about the inhabitants of the northwestern section of India who are astoundingly healthy because of the way they raise their food. A race of over 22,000 people, the Hunzas possess a bodily buoyancy that makes them utterly unique in the roster of the world's national groups. This book should revive our conception of nutrition. Full details show how any gardener or farmer can apply the Hunza methods. Cloth, 263 pp., 20 full-page illustrations. **$3.00**

ORGANIC GARDENING, Dept. O.G. 7-R, Emmaus, Pa.

THE ORGANIC FARMER

A New Magazine by the Organic Gardening Organization

AT the request of thousands of farmers from all parts of the United States and Canada, the ORGANIC GARDENING ORGANIZATION has finally decided to establish a new *farm magazine,* to be called THE ORGANIC FARMER. This magazine will be devoted exclusively to all aspects of farming such as crop rotations, the reclamation of abandoned farms, soil management, soil building and fertilizer practices and other fundamental agricultural practices based on the *organic method.* THE ORGANIC FARMER will in no way duplicate the materials published in *Organic Gardening* magazine. It will be concerned with the organic method as related to farms however small or large.

Sufficient tests of the organic method on a farm scale have been made to prove that this method is not only practical but highly profitable. Cover crops as green matter and sheet composting enable the farmer to make compost on a farm scale without special equipment or additional labor.

Each 64-page issue of THE ORGANIC FARMER will be filled with articles on the organic method on the farm, as well as the latest information on all aspects of farming. It will be issued monthly, beginning this summer.

Don't miss the first issue of this important new publication. Subscribe now for one year ($3.00), two years ($5.00), or three years ($6.00). Send check or money order, or ask us to bill you. *Write today!*

THE ORGANIC FARMER
Dept. OG-7F
Emmaus, Pa.

Your Own ODORLESS FERTILIZER FACTORY

Compost garbage and all sorts of waste materials without odor... even in a city backyard! Easy way to build rich soil, and grow better flowers and crops.

Now, with *ActivO*, it is possible (without chemicals) to make your own rich fertilizer—better than manure; better than you can buy—from garbage and other such materials... without odor. And make it QUICKLY. EASILY. CHEAPLY.

It is possible to reduce garbage to humus in 2 to 6 weeks! You may do it in an open heap, or in compost box or cabinet—in a tiny city backyard; even in basement or garage!

The "secret" is ActivO, a remarkable bacterial discovery which contains billions of the friendly, desirable bacteria that Nature herself uses to change waste into humus and rich plant food. You merely bring the waste materials together and sprinkle on ActivO. No skill required. Start a compost any month of year. Use any sort of vegetable or animal waste.

Low Cost: A little ActivO goes a long way—No. 25 size treats up to 3 tons of waste. With ActivO you can make fertilizer even from corncobs and sawdust, yet ActivO will not destroy earthworms or other beneficial soil agencies—for using ActivO is only using *Nature*, greatly intensified.

Only ActivO will do all this. Never before a product like it! But aiding compost-making is not the only way ActivO helps you grow prettier flowers, tastier and more healthful vegetables, thick-turf lawns. You don't need to buy special "soil activators." Applied direct to soil, ActivO conditions, fortifies and activates it; gives *life* to jaded soils—adds both the helpful organisms and many minerals, humus and nutrients for which most soil is starved ... ActivO also reduces odors in outdoor toilets while turning waste into easily handled, ash-like fertilizer.

You will want to try this unusual product. Get some ActivO *today*. If your regular dealer doesn't have it, use coupon below. *Don't* accept substitutes! There's only ONE *ActivO*—only one organic, bacterial product like this. Insist on *"Act-tive-Oh!"*

GIVEN Special Premium Award At no extra charge, with each order for a No. 25 size ActivO ($6.99) which treats up to 3 tons of compost, we shall be happy to mail you PLANS for building the A-1 Composter Cabinet like picture—drawings with list of materials and instructions. Both ActivO and plans prepaid. An ingenious way to turn garbage and waste disposal into garden profit. Odorless, continuous process. (Plans also free with No. 50 size.)

Check here ☐ If you want plans and No. 25 ActivO at $6.79 in stores, $6.99 ppd. from nearest dealer.

MAIL TO ➔ BENSON-MACLEAN PLANT PRODUCTS, Bridgeton, 34, Ind.
(Northeastern states, address ActivO-SOILSERVICE, Box 131, Townsend, Mass.)

Inclosed is ..... for $ ..... Send the following:
☐ No. 7 size, for 1350-1700 lb. compost, at $2.00 ea. prepaid.
☐ No. 50 size, for 6½ tons, at $11.95 each, frt. or exp. collect.
☐ No. 100 size for 12½ tons, $19.95; plans free.

NAME .....
ADDRESS .....
P. O. and State .....
Your Garden Supply Dealer's Name ..... And Address .....

☐ FREE literature: ActivO and composting.
SHIPPING POINT If different from P. O.
.....

MORE THAN A COMPOST HASTENER!

Organic-Bacterial
ACTIVO
Called "ActO" in Canada

Canadian Gardeners: Address ActO Plant Products, 218 Front St., E., Toronto, Ont.

Contents

VOLUME 15, NUMBER 1 JULY 1949

THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO ORGANIC GARDENING

Organic Gardening

The Forum		3
Editorial—Cancer Part III	J. I. Rodale	12
The Fireplace	Mrs. W. H. Eyster	18
The Ideal Compost	Dr. E. E. Pfeiffer	19
Lush Herbs	Eleanor Foster Chalfin	22
Miscellany		24
Earthworms		27
Ground Moles and their Control	Dr. Paul Scott	30
Soil and Health Foundation		31
Sweet Corn for Summer's End	Dr. W. H. Eyster	32
Biodynamic Plants and Solutions	Dr. E. E. Pfeiffer	35
Minerals from the Sea	Dr. J. H. Daughtry	41
Leaf Grinders		43
Botany For The Gardener (20)	Dr. W. H. Eyster	44
Garden Calendar—July		47
Hints for the Vegetable Garden		52
New Books		53
Announcement of Prizes		54
Readers' Correspondence		55

- Editor and Publisher
  J. I. RODALE

Managing Editor
DR. WILLIAM H. EYSTER

Art Director
KARL MANAHAN

Advertising Manager
VERNICE KEMMERER

Staff Photographer
ROBERT RODALE

ORGANI-CULTURE

Publisher monthly by ORGANIC GARDENING. Publication, Executive, Editorial, Subscription and Advertising Offices; 6th and Minor Streets, Emmaus, Pa. Subscription Rates, United States and Possessions, One Year $3.00, Two Years $5.00, Three Years $6.00. Unless otherwise directed all subscriptions begin with the current issue. Renewal subscriptions begin immediately after old subscription expires. When changing an address, give the old address as well as the new. Manuscripts should be accompanied by full return postage and a self-addressed envelope. Printed in United States of America. Copyright 1949 by ORGANIC GARDENING. Entered as second class matter January 27, 1943, at the Post Office at Emmaus, Pa.; under the Act of March 3, 1879.

PARROT TULIPS

The largest and most spectacular flowers you can grow in your spring garden.

RED CHAMPION... Firey red... 12 for $2.00
FANTASY.. Bright salmon pink.. 12 for $1.60
BLUE PARROT.. Beautiful violet-blue.. 12 for $1.60

Special Offer!
ORDER NOW
15 BULBS (5 each variety)... $2.00
36 BULBS (12 each variety).. $4.50

Send for Complete Color Catalog of Bulbs

CONLEY'S Blossom Farm
BULB GROWERS OVER 20 YRS.
BOX 386-R
EUGENE, OREGON

For Finer and Better COMPOST
Faster, Easier AMERICAN WAY.

AMERICAN COMPOSTER

No Mixing — No Turning
No Transferring — No Odor

THINK OF IT — Producing a valuable material from those things you throw away.
In four sizes, All Steel and scientifically built, properly AERATED for the correct amount of air to speed up Decomposition.
Priced from $60.00 to $600.00.
The American Composter will prove to be the most profitable investment you ever made.

American Composter Co.
GLEN RIDGE, NEW JERSEY
Mfg. Organic Fertilizer Equipt.

ORGANIC GARDEN PUTS CHEMICAL GARDEN TO SHAME

Gentlemen:

We have a very brilliant chemical engineer in our family, and nobody is more flabbergasted than I am that my little garden puts his scientifically planted garden to shame. My success must, undoubtedly, be due entirely to Organic methods, as I had absolutely no garden experience whatever up to four years ago.

Emeline L. Bootsman,
351 Fordham Place,
City Island, 64,
New York, New York.

—o—

HYBRID EARTHWORMS

Dear Sir:

As a matter of fact an "economic zoologist" on the staff of one of our outstanding universities has stated: "There seems little doubt that these earthworms (so-called hybrids) represent some modification of species. The transverse bars are very characteristic of the manure worm but on the other hand the manure worm does not attain the size of the so-called hybrids."

The Arizona Earthworm Farm,
Bertha Stevens,
Phoenix, Arizona.

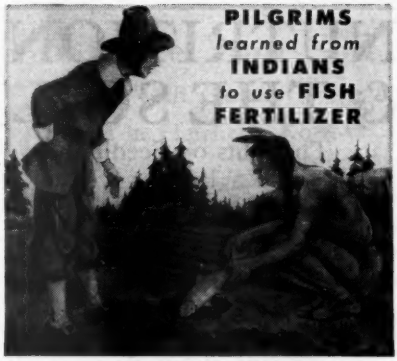
—o—

ORGANIC FRUITS

Gentlemen:

Have followed the organic method for two years and am convinced it is the only method to raise good fruit and vegetables.

I have an English walnut tree that was planted three years ago this spring, composted and rock mulched two years ago, that had several wal-



"Sea-Going FISH the IDEAL FERTILIZER"

—says Editor J. I. Rodale

"A sea-going fish, unlike cattle, does not eat food raised with chemical fertilizers. It feeds in waters rich with minerals, prominent among which is the most valuable element, iodine." Science says Mr. Rodale is right. Analysis shows that these many essential minerals are not only present in "sea-going fish"—they are also "available" for plant use.

Unless you got your garden plot directly from the Indians, SOMEBODY depleted its vital essentials before YOU took over. This deficiency is perpetuated in the compost you produce, and in the manure you get from farms which probably suffer from soil deficiency.

ATLAS FERTILIZER EMULSION

is a POWERFUL CONCENTRATE, made from the non-edible (richest in fertility) parts of sea-going fish. Is is rich in natural "life factors" without which no plant or animal long survives—including the complete B-complex vitamin groups. It contains ALL 17 plant food essentials and valuable trace minerals—more than any soil, compost, manure or other fertilizer. Just dilute ATLAS with water as directed—apply with can or hose applicator. Use for all gardening, compost, potted plants, lawns, flowers, vegetables, berries, trees, shrubs.

DEALERS—Write for Proposition.

ATLAS FERTILIZER EMULSION—Room 800 1 Drumm St., San Francisco 11, Calif.

Please send me your trial pint (makes 80 gals.) of ATLAS FERTILIZER EMULSION–$1.00 enclosed.

My name_____

Street or Route_____

City_____ State_____

My garden supply dealer is—

His name_____

His address_____

City_____ State_____

JULY-49

NUTRITION & THE SOIL

Thoughts on Feeding
by
DR. LIONEL PICTON, O.B.E.
with an Introductory Essay on Creative Medicine
by
DR. JONATHAN FORMAN,
F.A.C.A.

Everybody eats. Everybody should know *what* he eats. Is the food of today fit to eat, or has mass production and processing made it synthetic—lacking in minerals, vitamins and other health-building elements?

In the U.S.A.—the world's best-fed nation—chronic illnesses and deficiency diseases are on the increase; mental illness and nervous disorders have become a frightening problem; half the population (judging by Army examination standards) is way below par; "one in 8 will die of cancer" etc., etc., etc.

With farmers plagued by every known plant and animal disease (mostly deficiency diseases) and ever-increasing swarms of pests, isn't it reasonable to say that a great deal must be wrong in the way our crops are grown?

Dr. Lionel Picton, one of England's greatest experts in the fields of nutrition and public health, came to the conclusion, arrived at from a lifetime of observation and testing, that *nourishing food can only come from crops and animals raised on organically fertilized soils*—a conclusion which should startle anyone familiar with modern food production methods. He gives his evidence for this sobering doctrine in *Nutrition & The Soil.*

Dr. Jonathan Forman, Editor of the *Ohio State Medical Journal* and vice president of Friends of the Land, an American pioneer in nutrition and soil relationships, has written a challenging essay by way of introduction to Dr. Picton's work.

NUTRITION & THE SOIL should be read by every doctor and farmer and gardener in the land. What Dr. Picton and Dr. Forman have to say cannot be laughed off. Bigger and bigger hospitals, national clinic programs, etc., are only a part of the answer to our vast sickness problems. *Nourishing* food is basic. And "the soil is the source of life"—what happens there is of the utmost importance to us all.

Cloth bound, illustrated, 5½x8 400 pages
$4.00

Order from ORGANIC GARDENING,
Dept. OG-P7, Emmaus, Pa.

nuts last year. It was a whip grafted on a two year rootstock, variety Franquette. Could go on and on about cherry, peach and apricot trees, also strawberries, other berries, asparagus, etc.

Now here is a point I would like to bring to your attention.

I believe you could give more thought to cooking methods. We cook all our food at low heat (no boiling) in 3-ply stainless steel and we feel better and sleep better since using this method (fresh ground wheat, brown rice, potatoes with the skins on, etc.). In other words, after you have raised this food in the proper manner, why not continue and prepare it properly? This applies to the food that should be cooked to be more palatable. (Raw vegetables have their place also).

Mr. A. V. Thompson,
Route 3, Box 263F,
Medford, Oregon.

—o—

A TRANSFORMED GARDEN

Gentlemen:

When we first moved here, nearly five years ago, the soil of our fifty by fifty garden was like the gravel street in front of the house; it was so hard, and would scarcely grow weeds. It took me about three weeks or more to spade it. One of our neighbors who plows gardens for a living, refused to put his plow into our garden, for fear of breaking his plowshare.

But my brother, Ed. Firth, one of your subscribers, who operates the "Medo-Mist Mushroom Farm" here, introduced me to your O. G. system, which has about transformed my soil so that I can now spade my garden in two or three hours. And we are constantly receiving compliments from our neighbors and friends for our "wonderful garden". My brother's wife (who was reared on a farm), says she "never tasted such good carrots in her life", as some we gave them last summer. My brother uses the compost from his mushroom beds exclusively, in his garden. He had an acre of most wonderful and delightful vegetables of

almost every kind last summer, with everbody's compliments.

In closing, permit me to add that (contrary to all our neighbors), we never put our garbage out for the city collector, but it goes into our box. I also went way up the street to rake my neighbors' lawns to get their leaves. I had a whole truckload last fall, some of which I put in my box, and the rest about a foot thick all around the box, to protect the worms. These I shall put in my box this spring. I emptied my box in the fall, putting a good wad around every cherry tree, apple tree, shrub, etc. I put about two inches all around my tomato plants and all along each side the rows of the various vegetables. The soil falls apart when I put in my fork now, so it is a pleasure to work it, whereas it was back-breaking previously. The weeds are negligible too as I scarcely used my hoe last summer. . All this in about three years.

Rev. Walter Firth,
1533 Lincoln Ave.,
Flint, 3, Michigan.

—o—

COMPOSTING MAKES BETTER WINE!

Gentlemen:

I am sure you have thousands of success stories dealing with composts. But I think you would be interested in my aged father's success.

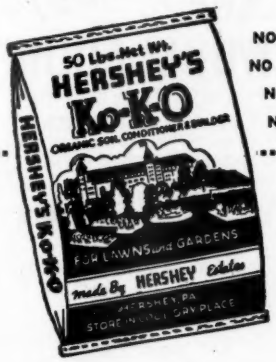
He has always made his living from the ground, and has always said it is the healthiest way of life. He is living proof of it. He was eighty-one in January, and can still walk a mile to town and back with no ill effects. He works his garden every summer, and is right now planning for next summer's garden.

He has subscribed to *Organic Gardening* almost from the magazine's conception, and has agreed with your views on the use of fertilizers and poison sprays. But, without spraying, his pet grape vines lost vitality, became prey to disease, and where he was used to harvesting twenty to thirty bushels of grapes, they yielded

Improve Your Soil

With Humus

Found in Hershey's Ko-K-O



NO WEEDS
NO WATER
NO ODOR
NO ACID

HERSHEY'S

Ko-K-O

ORGANIC SOIL BUILDER AND CONDITIONER

FOR LAWNS AND GARDENS

- Apply Direct to the Soil
- Mix in the Compost Heap
- FEED TO EARTHWORMS

An essential material for the Organic Gardener .... A slow-acting, long-lasting energizer that increases and replenishes the organic content of the soil .... Improves soil texture .... absorbs and retains plant-nourishing moisture .... helps decomposition of soil break-up into humus .... binds sandy soils .... loosens clay soils.

WHAT IS HERSHEY'S Ko-K-O?

Cocoa bean shells and other parts of the cocoa bean are expertly blended and sweetened to produce a natural, organic material furnishing a steady source of humus for the soil.

PACKED IN HANDY 50 LB. BAGS

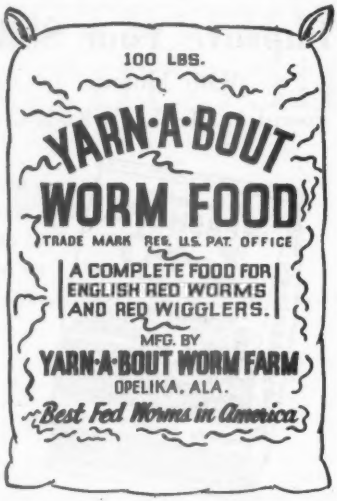
If your dealer cannot supply you we will ship direct to you. Freight prepaid East of Mississippi River. (Write for freight rates west of Mississippi River.)

NEW LOW PRICE

Send $1.90 for each 50 lb. bag; enough for 200 sq. ft. of NEW lawn or garden. Minimum Shipment 100 lbs. (2 bags)

HERSHEY ESTATES

HERSHEY, PENNSYLVANIA



YARN-A-BOUT WORM FOOD

The only thing of its kind on the market. Produces bigger and better worms faster than any other product. Add to your compost heap to assist the worms in their work in reducing organic matter to humus. Shipped in 100 lb. bags only, $7.50.

YARN-A-BOUT WORMS

Breeders, $5.00 per 1000, delivered.

Special bred worms to work the year round.

Turnips, 6 to 12½ lbs. Grown in pure humus from our worm beds. No commercial fertilizer used.

YARN-A-BOUT WORM FARM

OPELIKA, ALA.

only two or three bushels. Most of the vines dried out and bore no fruit at all.

Last winter and spring, he began using the compost heaps he had been building the previous year. He does not allow us to throw out any garbage, but all goes into the compost! He used only a small portion of his garden for the initial test. He used no fertilizer or poison spray . . . only compost.

Last Fall he had a fair yield of grapes. He was not troubled with insects and disease. The vines were stronger, and the leaves were larger and greener on the treated vines. He was more than satisfied with the results.

BUT . . . the thing that surprised and pleased him most was the amount of wine his harvest gave him. For the grape was about three times as juicy as it had ever been, even during the best years. And better yet, is the improved taste of the wine he made from it. It is not bitter as the usual Concord wine, but leaves a dry taste in the mouth like the California Zinfandel.

I would just like to see anyone win an argument against the benefits of composting with my father!

Mrs. Jennie Romano,
RFD No. 3, Box 401,
Bangor, Penna.

—o—

FRIENDLY INSECTS

Gentlemen:

Why do you not tell us a little more about the beneficial insects in our gardens? This came to my attention recently when I was talking with an entomologist about the cabbage worms on my broccoli.

All through the summer I saw the white butterflies of the cabbage worms flying around and over the broccoli plants. And so I examined these plants carefully to find the worms. I found them, but they were all very small. I left them alone to see what would happen, and they disappeared without apparent cause. One single

worm reached a length of about half an inch before it disappeared, but he was an exception. Few were as long as a quarter inch.

These were the facts which I stated to the entomologist, and he answered that they must have been eaten by some of the insects which live in the soil. He told me that there were such insects, which only come out of the ground at night, that their habits were much like cutworms except that they never eat plants but only the small insects which feed on plants. And he added one interesting statement, that these friendly insects were more easily killed by sprays than some of the plant eaters. Had I sprayed, I might have killed 90 per cent of the cabbage worms and 100 per cent of their enemies, and the 10 per cent of the worms left might have done a lot of damage.

But what are these friendly insects, and what should we do to encourage them? They will not be ready to work for us unless they have something to eat the rest of the year. What do they eat when there are no more cabbage worms?

I have a theory, which is mere conjecture, but it is the best explanation I can think of. When we put a lot of organic material in or on the soil, in varied stages of decomposition, there may be a lot of kinds of small creatures feeding on this organic matter. These small creatures would help by turning the organic matter into humus. And at the same time, they can serve as food for our friendly insects, until the cabbage butterfly, or some other, furnishes them with some more choice morsel in the shape of a small worm.

Mr. A. N. Forbes,
172 Union St.,
Worcester, 8, Mass.

—o—

ROSES

Gentlemen:

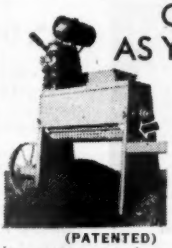
I have over 50 rose bushes and last year they were pest free in foliage and the roses were beautiful. A guest said

Cast Iron Flower Stand

Authentic Antique reproduction. White. 11 movable arms, ranging from 14" at base to 7" at top. Send $29.50. Specify freight or express. Flowers and pots not included. Send for catalog of other cast iron items.

J. F. DAY & CO., DEPT. 60

1903 Fourth Ave., S. Birmingham, Ala.



COMPOST AS YOU WANT IT

- ..SCREENED
- ..SHREDDED
- ..GROUND
- ..MIXED

(PATENTED) Rocks, trash separated. Grinds manure and tough organic matter through rolling screens, wet or dry. Screens fine as wanted through perforated screens. Free compost circular.

W-W GRINDER CORP. Dept. B WICHITA, KANSAS

LEWISIA REDIVIVA

Flowers like exquisite pink water-lilies. Hardy, easy low perennial. Plant dormant tubers now. 10 for $1.00; 60 for $5.00. Illustrated Bulb Catalog ready.

REX. D. PEARCE
Dept. D. Moorestown, N. J.

PEONIES, IRIS HEMEROCALLIS

AND IMPORTED BULBS

Write for our new folder of Diamond Jubilee Offers
Our 75th Year

SPECIAL 3 PEONIES for $1.00

1 Red 1 Pink 1 White Postpaid U.S.A.

SARCOXIE NURSERIES PEONY FIELDS
WILD BROS. NURSERY CO.
Dept. O Sarcoxie, Mo.

my row of cabbages was as beautiful as the roses. My carrots and chemically grown carrots are just two different things. But, of course, you know. Anyone who tries it has results.

Mrs. R. G. Nesbitt,
Box 752,
Mialand, Ontario, Canada.

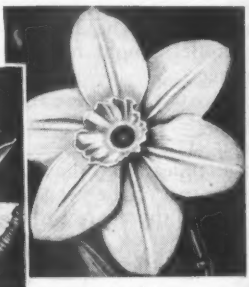
—o—

Dear Sir:

I have been getting an occasional item of H. G. Hastings Seed Co., Atlanta 2, Ga. In their 1948 catalogue they front-paged their Yellow Prolific corn, an open pollinated corn. Some people claimed it to be as good as golden bantam for roasting ears. (Because of this it made the best silage

Giant Trumpet

Triandrus Hybrid



Leedsi

Double Flowered

COLLECTION $4.00
3 each of the four varieties listed, 12 double-nosed bulbs.

SNOW WHITE DAFFODILS

The newest varieties. Choice selections assuring many years of unusual pure white blooms. Bulbs eventually form clumps, each with as many as 50 flowers. Excellent for cutting. A sound garden investment. Order now.

Giant Trumpet *Mt. Hood:* Pure white. Petals 4 in. across frame long, frilled trumpet. 20 in. tall. Each 65¢, 3 for $1.80, doz. $6.50.

Leedsi *Polar Ice:* Pure white throughout. Petals 3½ in. across. Saucer-like crown. 22 in. tall. Each 35¢, 3 for 90¢, doz. $3.50.

Double Rose Flowered *Daphne:* Unusual new type. Pure white, fragrant. For cutting. 14 in. tall. Each 35¢, 3 for 90¢, doz. $3.50.

Triandrus Hybrid *Thalia:* Late blooming. 3 graceful all white flowers to a stem. 24 in. tall. Each 40¢, 3 for $1.05, doz. $4.00.

All Mail Orders Promptly Acknowledged. Delivery—Mid September.

Send for New Fall 1949 Planting Catalog

Tulips, Hyacinths, Daffodils and other Imported Holland Bulbs . . . Peonies, Lilies, Phlox, Violets . . . a wide selection of Iris, and other new and popular hardy bulbs and plants for your Fall planting. Color illustrations; helpful cultural information. Catalog ready July 15. Send 10¢ now to reserve your copy.

flowerfield®

SINCE 1874

FLOWERFIELD BULB FARM, INC. • DEPT. 85 • FLOWERFIELD, LONG ISLAND, N. Y.

even when planted too far north for corn maturity. Personal letter to me.) It is a 140 day corn and yields as high as 200 bu. to the acre. I planted it with good results May 15th, here in Delaware.

It was pictured to show 7 and 9 ears to the stalk. I planted 1 acre and got 50 bu. of corn rows 5 ft. apart. I have not limed the soil and goats pastured there for the past 8 years. I plowed, disced and cultivated two times. There were no manures added or anything else. That corn grew 10 to 14 feet tall and I saw 2 stalks trying to mature 7 ears and one, 8 ears. To be sure they did not because they had nothing to eat, but I did get 4 medium ears and 2 nubbins occasionally. The best I saw were 4 nice ears on a stalk. This Company carries a white prolific corn and about 6 other ordinary open pollinated varieties of corn.

Lewis Wilkins
R. 1
Newark, Delaware

—o—

FASCINATED BY O. G.

My Dear Mr. Rodale:

The entire subject of *Organic Gardening* is one of more than mere interest with me. The relationship of soil to health is ever-absorbing both in my work as a physician and in working about my own small half-acre in town. We have seen the results of working with composted soil and the compost heap is used up greedily as fast as it is ready. We have seen blights disappear with the use of compost on laurel and rhododendron, insect-free vegetables and other startling manifestations from improved soil.

But the growing of roses still remains an unlicked problem. Black spot, aphis and sundry ailments continue. I wonder if you could refer me to any material written on this subject or if you have had any experience in this field of rose-growing?

Leon H. Goldberg, M. D.
175 North Broadway and
Tallman Place
Nyack, N. Y.

Chase

Bargain Offer to Gardeners!
This 2-Fold Offer Includes

MAYE BRUCE'S 'COMPOST MAKING'

A new and intensely useful Guide by this foremost living authority. Tells you in simple language how to ensure maximum success in the preparation of large or small compost heaps. With this book we send

A Large Packet of
'Q. R.'
COMPOST MAKER

Sufficient to change six heaps of garden waste into rich humus-laden compost inside a few weeks. Purely herbal, no chemicals.

THE TWO **$1** POST PAID
Liable to Nominal Customs Duty

CHASE PROTECTED CULTIVATION LTD.
THE GRANGE, CHERTSEY SURREY, ENGLAND

ORCHIDS
For You

You can successfully grow orchids in your own home if you will follow My price list is free and gives complete instructions. certain instructions. for success with these gorgeous blooms. Send for it.

Blooming size species and hybrid seedlings

MARGARET ILGENFRITZ
MONROE MICHIGAN

PLANTS GROW BETTER in SIFTED SOIL

THE SOIL SIFTER

will give you better results in your flower beds, seed flats, hot beds, cold frames, potting house, etc. For spreading fertilizer, too. Green enamel, welded steel construction. Holds 30 lbs. Fine or coarse mesh. (Please specify on order) **$1.35 EACH $2.65 for set of two.** No C.O.D.'s please. Immediate delivery. Post paid east of Mississippi. Add 15c each west of Mississippi.

THE RICHMOND MFG. COMPANY

Dept. OG
1100 Altamont Ave.
Schenectady 7, N. Y.

USE NATURE'S WAY
...TO RECONDITION YOUR SOIL
...TO INCREASE CROP YIELD

M-E ROTARY TILLAGE MULCHES VEGETATION INTO SEED BED...

4 or 6 sets on each Patented Tine Unit

AERATES SOIL . . . LEAVES IT HUMUS

Use it spring, summer, and fall to rebuild soil Nature's way by cutting and mulching vegetation throughout tilled depth. This aerates soil leaves it humus, improves moisture and mineral content, requires less fertilizer. And M-E Rotary Tillers have extra mechanical advantages: 4-cycle engines on all garden models..no tine breakage .. precision-built.

G-16

Power Take-Off Models Also Available

Ask your dealer for free demonstration or write today.

Patents Pending

Milwaukee Equipment Mfg. Co.
Dept. OG-7 South Milwaukee, Wis.
Please send me illustrated folder, prices, and name of nearest M-E Rotary Tiller dealer.
Name.....
Address.....

ROTARY TILLERS
MILWAUKEE EQUIP. MFG. CO
So. Milwaukee, Wis., U. S. A.

Copyright 1949 Milwaukee Equipment Manufacturing Co.

PERMATAG

Aluminum Markers For Your Plants

THAT YOU CAN WRITE ON

Merely write the name of the plant into the metal. It cannot wear off. Easy to attach. Remains securely fastened on the plant or stem. Impervious to weather. Rustproof. If your dealer can't yet supply, order direct.

96 (4 pkgs.) $1 pp.

WESTERN GROWERS SUPPLY CO.
897-A E. Walnut,
Pasadena, California

ORGANICULTURE IS BETTER

Gentlemen:

I am running my little ten acre farm by the Organic method and after nearly going broke trying to farm the old way, I am now doing much better the Organic way.

The Organic Gardening magazine was a life saver for me. I am 67 years old and going strong and hope to make a model place out of my ranch. It is lots of fun the natural way.

John S. Cookerly
9531 Popanga Canyon Blvd.
Chatsworth, California

—o—

COMPOST — SUCCESS

Dear Sir:

I was very much interested in the article in your January issue, under the heading of "Compost Clinic". After getting out of the service in 1946, I started quite a large home garden because I liked the work. As manure was hard to get and very expensive, I got thinking about compost. My property had a good crop of weeds after six years of neglect. I decided that I would try to break them down with compost but what a job I had turning (at that time I was ignorant of the use of activation) this pile—real back breaking job. Knowing that one of my neighbors had a chaff cutter not being used, I bought it and through it went all my weeds and straw which it cut into pieces about 1¼". Then I mixed in a little lime and ordinary earth. I found to my surprise that after just a few hours, the bacteria had started to work and after a few days it was like a furnace. I turned it once and left it all winter in a pile. In the spring I plowed a furrow, put in the compost (if you could really call it such), then covered it and planted strawberries. Unfortunately, I sold the place before the crop was picked but the comment of the buyer was "I don't know what that fellow put under these strawberries but they are the largest and best berries I ever saw." So I take from that that I was on the right track and that the chopped up weeds,

etc., did the trick. Now I have 15½ acres and am starting out along the same lines with a little more knowledge than I had then. Thanks to the reading of *Organic Gardening*.

M. H. Cordy
R. R. 1
Brooklin
Ontario, Canada

—o—

O. G. ENTHUSIAST

Gentlemen:

I have read every issue of *Organic Gardening* for a few years and am enthusiastic about the idea. We are a family of three adults, living on a lot just over one-third acre and have no chickens or other animals to produce fertilizer. All of our garbage, grass clippings, etc., go into our small garden—and the garden spot up to a few years ago was a clay tennis court! And I do mean clay!

In commercial fertilizers I am limited to Milwaukee and Grand Rapids sewage, called Milorganite and Rapid Gro; and cow or sheep manure from Armour's or Swift's stockyards. Do you know if these four are free from harmful chemicals?

In my small plot I farm intensively, planting rows close together so the foliage when grown, will cover the ground. As soon as planted, I cover the ground with grass cuttings, lawn clips, etc., to keep the sun from shining directly on the ground. In the Fall, the entire garden is covered several inches deep with leaves and twigs. Is my idea right—to keep the sun from shining on the bare ground?

I am not troubled with tomato worms, bean bugs, cucumber beetles—and I do not spray. Each year at market prices, I can figure that I am getting over $100.00 worth of crops from my miniature farm for our own use.

Continued success to you in spreading the right idea.

Harry C. Wilson,
730 Norton Drive,
Kalamazoo, Michigan.

NU-ERTH
100% PURE WORM CASTINGS

Nature's best food for all varieties of indoor & outdoor plants.

Clean . . . odorless . . . easy to use. Contains no inorganic chemicals . . . just pure worm castings. Promotes more luxuriant foliage and stronger growth. Will not burn or harm tender seedlings.

SPECIAL MAIL ORDER OFFER—
Two 1 lb. tins $1 postpd.
Limited Supply. Max. 12 tin limit

HOUSEHOLD UTILITIES CO.
714 W. WISCONSIN AVE. MILWAUKEE, WIS.

OREGON QUALITY ROSES • BULBS
ORNAMENTAL TREES and SHRUBS
FRUIT TREES and BERRY PLANTS
Send for Complete Catalog
Rich & Sons NURSERY
HILLSBORO, OREGON

WRITE TODAY
Tualatin's big FREE 1949 FALL Bulb list
TUALATIN VALLEY NURSERIES
OVER 30 YRS OF GROWING P.O. BOX 310 SHERWOOD, OREGON.

ROOT YOUR OWN CUTTINGS IN SAND

In a box, greenhouse or hotbed. Scientific instructions, copyrighted, $1.00. It is easy to root cuttings, quickly, of Camellias, Azaleas, Gardenias, Roses, Evergreens, and all plants, any time, with our simple instructions. This information cost us Thousands of Dollars and years of experience, and it is offered to you for only $1.00 postpaid. The booklet consists of 11 pages of printed matter 3½"x 6".
Catalog free on Camellias, Azaleas, Gardenias.
NATIONAL NURSERIES Dept. 22 BILOXI, MISS.

CANCER—PART III

PRIMITIVE PEOPLES

There is overwhelming evidence that there exists some relationship between the food intake of the body and its welfare and health. This stands to reason. The body is dependent basically for its functioning and subsistence on the nourishment that is furnished to it. If we do not eat, we die. If the sustenance is inferior, or lacking in necessary elements, malfunctioning must result and does—as is shown in the archives of medicine. Such diseases as pellagra, beri-beri, scurvy and others have been traced to dietary deficiencies. When the deficit is mended spectacular cures have been accomplished.

In the last few generations there has been a grievous and accelerating tendency to tamper with the food supply —to preserve, to purify, to refrigerate, to adulterate, to dehydrate, to fragmentize, that is to eliminate portions of the food which carry important vitamin and living elements because of processing and storage difficulties, sometimes as with white bread, producing a product of mere starch and fibre, fearfully chemicalized and not fit to be eaten by human beings. We can learn a great deal by studying primitive peoples who eat a primitive, simple diet, untouched by the avaricious hand of the factory. Let us consider one of these, the American Indian.

Dr. Fred L. Hoffman in his book, *Cancer From the Statistical Standpoint* says, "It was ascertained that in the experience of practicing physicians on Indian reservations, cancer in any and all its forms had been extremely rare." The American Indian possibly knows more about nutritional value of foods in general than the average person gives him credit for, or is it merely that he is a child of nature, worshipping her, and thus living within her jurisdiction, to the benefit and well-being of his body.

Dr. Fred L. Hoffman in an article in *Metron,* Vol. X—N. 1-2; 15—IX—1932 entitled *Causes of Death in Primitive Races,* says:

"Primitive races offer extraordinary opportunities for strictly scientific studies of mortality problems. Until such races come in close contact with civilized men they generally present a healthy, robust and vigorous appearance. That, at least, seems to be the consensus of qualified observers who studied the native Indians in America soon after early settlement by Europeans. Thus, for illustration, in the work on *The Rise and Fall of Disease in Illinois* it is said:

" 'The Indian constitution was the result of many influences. Because of his lack of thrift, foresight and energy he was subjected to periodic lean years. In consequence of his life he had a capacity for great and sustained effort and an ability to withstand hunger. He had a fine stature on the average and great physical vigor. To those diseases which threatened him in the wild state he had a fine resistance and yet he was short lived. He died at an average early age and there were few children in the average Indian family. It is not easy to understand why so fine a constitution went hand in hand with a short life span and small families with children spaced far apart. History would indicate that wars and famines furnished the explanation.'

"From the same source I quote a statement by Hrdlicka, the well known physical anthropologist, who observes:

"'The traditions of the Indians, the existence among them of elaborate healing rites of undoubtedly ancient origin, their plant lore, in which curative agents' properties are attributed to many vegetable substances and the presence among them of a numerous class of professed healers, honored, feared and usually well paid would seem to indicate that diseases were not rare, but actual knowledge and even tradition as to their nature were wanting. The condition of the skeletal remains, the testimony of early observers and the present state of some of the tribes in this regard warrant the conclusion that on the whole the Indian race was a comparatively healthy one. It was probably spared at least some of the epidemics and diseases of the old world such as smallpox, rachitis, while scourges such as tuberculosis, syphilis (pre-Columbian), typhus, cholera, scarlet fever, cancer, etc., were rare if occurring at all.'"

This refers more or less to the Indians of the past. Now let us consider conditions today. In February, 1949, the following United Press dispatch was printed in many newspapers:

"An American Medical Association study team suggested today that federal officials find out why there are so few cases of cancer, diabetes, scarlet fever and some heart diseases among Hopi-Navajo Indians.

"The doctors want to know if the Indians' apparently inadequate diet gives them a resistance to the diseases.

"Members of the team, who made their suggestion in the A. M. A. journal, are Doctors Samuel Ayres, Jr., and Harold E. Crowe, Los Angeles; A. A. Thurlow, Santa Rosa; Louis C. Ruschin, Oakland, and Lewis J. Moorman, Oklahoma City.

"They said the Indians provide unusual opportunities for sustained and controlled research in important phases of medicine now posing serious questions.

"The Indians' diet seems to be low in quality and quantity and wanting in variety and the doctors wondered if this had anything to do with the fact that only 36 cases of malignant cancer were found out of 30,000 admissions to the Ganado, Ariz., Mission Hospital.

"'In the same number of white persons,' the doctors said, 'there should have been about 1800.'

"Diabetes also apparently is rare among the Indians. In 25,000 patients studied at Ganado, only five cases were found. Of that many white patients, there would have been about 75 times more cases, they said.

"The Indians also apparently lack susceptibility to scarlet fever, the doctors said, and there is a low incidence of degenerative cardiovascular conditions."

The dispatch speaks of an apparently low quality or inadequate diet. What these physicians consider inferior may be the very thing that is giving practical immunity to cancer to these Indians. In their report in the *American Medical Journal* of February 5, 1949 these five doctors come close to something that might have given them a clue for further research. They say:

"Among the innate psychologic and spiritual obstacles are the profound attachments of the Navajos to their mother earth, which in their opinion gave birth and ultimate haven to not only their gods but to them and their children as well."

This philosophy the worthy, but unknowing doctors call an obstacle. If all farmers would only consider their soil *Mother earth*, and treat her with more reverence, would they turn out crops more healthful to the eaters thereof? The Navajo, it is a known fact, uses practically no chemical fertilizers.

Let me quote from the doctors' report in the A. M. A. Journal:

". . . the government planted the Navajos on the present reservation without reckoning with the exigencies of the forbidding terrain. The dependence on their herds and the sparsity of herbage inevitably made nomads of the Navajos and kept them on the move, threading ancient arroyas, wading sand dunes, scaling bluffs and unobtrusively blending with sage and

sheep on lonely mesas . . . . only 20 per cent of the Navajos speak English."

This is scarcely a set-up for the prospering of chemical fertilizer dealers. The distances are great, the money supply inadequate, and the Navajo loves his mother earth, who is one of his gods. A reader of *Organic Gardening* who studied this question advised us that the Navajos use no chemical fertilizers. We have many readers in Arizona and New Mexico. Would they check into this situation and advise us? Chemical fertilizers cause an oversupply of carbohydrate in the crop and a reduction in the protein. They encourage formation of cellulose which crowds out the minerals.

The report in the Journal of the American Medical Association draws attention to the poor health generally of the Navajos. They say:

"The diseases afflicting the Navajo-Hopi Indians with few exceptions differ from those found in the white population only in degree, and this difference is due to environmental conditions, want of education and adequate medical care rather than to innate racial factors and influences. For example, the meager statistical data regarding tuberculosis indicate that the mortality from this disease is approximately 10 times that in the general population.

"Yet its course in the Indian closely parallels that in the white man. This being true, we must conclude that the difference must be due to provocative factors in the environment, including faulty nutrition, physical hardships, overcrowding in the hogan and inadequate medical care, which implies the lack of effective case finding, the failure to break the contacts, imperfect methods of management and the lack of sanatorium care with all the modern phases of collapse therapy and eternal vigilance through adequate follow-up service."

For a long time the Navajos had only one doctor for 15,000 to 20,000 persons and their condition is not much better today. Their general lack of knowledge of elementary principles of hygiene takes its toll in the contagious diseases, it can be seen, but they do not seem to be susceptible to the degenerative type of maladies such as cancer, heart disease or diabetes, which are not contagious. They live under difficult conditions. "Few persons know," say these doctors, "that often the Indians are dependent on temporary water holes for drinking water, which is sometimes thick enough because of yellow mud to make good topsoil."

The physicians refer to their apparently inadequate diet, but there is something in their way of life that gives them immunity to the degenerative diseases. Could it be that very inadequate diet? The doctors say:

"They seem to do very well on a rather simple limited diet. Compared to our general population they are virtually free from cancer and diabetes and they have a very low incidence of heart and blood vessel disease (arteriosclerosis). Among our people these three conditions are on the increase and contending for first place in mortality statistical columns. Perhaps the limited diet, the slow pace and the desert poise have much to do with this interesting disease discrepancy."

They bring in another factor, "desert poise," intimating no doubt that the faster tempo of city life induces to cancer. No doubt it does, somewhat, but not entirely. For the years 1940 to 1944 inclusive, in the U. S., cancer cases per 100,000 of population in rural sections were about 70% of those in bigger city areas. But with the Navajos there were 36 cases of cancer where there should have been 1800, or only 2%. Another complicating factor is the fact that the lower cancer rate in rural areas generally may be more allied to the closeness of a fresh food supply, and the growing and eating of more vegetables from people's own gardens. I have been led to this line of thought from the fact that there are more mental cases and insanity in rural communities than among city folks, because poise and quiet, one should imagine, should be a factor in the causation of insanity.

While the fast tempo of modern city life may lower the resistance of the body to disease, it would seem to indicate a need to feed that body a more potent supply of food to enable it to withstand the rigors of going to late evening parties, getting jostled about on subways and streetcars, etc. These sins may lead to more colds and headaches but hardly to cancer. We must go deeper for that.

Constipation pretty nearly always precedes cancer of the intestinal tract. We are cautioned to watch that, of course, along with other symptoms. I should imagine that a constipated Navajo Indian is a rarity. But I must condition this statement and here I am extremely sorry that the A. M. A. doctors did not divide up their findings between city Navajos and country Navajos. When I went through New Mexico a few years ago I passed through small towns where one saw hundreds of these Indians standing, almost shoulder to shoulder, on the sidewalks, taking the sun.

These city Navajos had closer contacts with white bread, Coca-Cola, candy and other of the civilized foods of our country. Are they becoming susceptible to cancer, heart-disease and diabetes? Are they becoming more constipated and are they beginning to take the chemical cathartics that may be irritants to the intestinal system?

We know that the country Navajo eats practically no white bread, and I know from a study of the subject and from personal observation and experiment that this food is the worst offender in causing constipation. If you have this condition I would recommend that you immediately cut out all bread and cereals, both white or whole wheat, and all grains, until the situation improves. Eat more vegetables and fruit. I have seen sensational cures. Then eat only the whole grain product.

It is interesting to note what George Z. Dupain, Sydney, 1934, in his book *Diet and Physical Fitness* says about constipation:

"Another cause of chronic constipation is the quality and the quantity of the food eaten. Man seems to be the only animal who does not know how to select his food. Most of his dietetic instincts have been led astray. 'To live on foods which have been deprived of ballast, bereft of vitamins, despoiled by catalysis and freed from mineral salts, is to invite intestinal stasis (constipation) with all its sinister attendants.' (Sir Leonard Williams.)

"One of the gravest defects of the civilized diet is its lack of raw foods and ballast, or roughage. We eat overmilled cereals, chemicalized sugars, softly cooked vegetables, sloppy seasoned hashes, slushy puddings and soups, pappy porridges, sophisticated and highly-refined concocted dishes of all kinds. In such a diet there are no rough irritating substances to stimulate intestinal peristalsis."

In the book, *Chronic Constipation*, by J. Ellis Barker, London, 1927, Sir Arbuthnot Lane, says:

"Cancer never affects a healthy organ. In every case in which I have had an opportunity of verifying it, I have found that the cancer patient was suffering from chronic intestinal stasis, and that the infection by cancer was an indirect consequence of this condition. Cancers of the skin and tongue, which are produced by chronic traumatism alone, are not included in this category. If this assumption is correct, it is obvious that, to prevent the development of cancer, it is necessary to obviate these changes, which result in the gastro-intestinal tract from the diet and habits of civilisation. . . . Cancer is the final stage in the sequence of chronic intestinal stasis. It is the last chapter in the story of defective drainage of the large bowel as it is in the rest of the gastro-intestinal tract."

We must consider the whole foods that the Navajos eat which to us seem primitive. They gather acorns, pinenuts (In New York City sold on pushcarts and called *Indian nuts*), hazel nuts and chick peas. They hull the acorns, dry them and grind with chick peas, usually with a rock mortar and pestle, and make a mush out of them. They gather mesquite and wild beans

which they make into a kind of bread. The mesquite pod grows quite long, perhaps up to 12 inches, and contains a dry, moist brownish sugar. Here may be a clue to the "inadequate" diet of the Navajo that might be making him immune to cancer. They eat foods that are not grown with chemical fertilizers and that are not sprayed. Note that acorns, pine-nuts, chick-peas, wild beans and the bean in the mesquite pod are all seeds. From them will grow huge amounts of plant tissue and trees. They contain living elements which nature has implanted there for the perpetuation of the species.

The Navajos, in using a mortar and pestle or other crude device for mashing or grinding up food, retain practically all the nutritional elements. They do not use anything like the huge steel rolling mills of our flour mills, the heat of which devitalizes the little that is left after the wheat germ is extracted. It is rather strange that the first reported outbreak of poliomyelitis in 1840 in Germany was only one year after the steel roller method of milling white flour was adopted in Vienna. By 1890, poliomyelitis grew to epidemic proportions. The Navajos are immune to infantile paralysis or multiple sclerosis, the disease which killed the famous baseball player, Lou Gehrig.

To draw another comparison between the dietary of the Navajos and that of the general population, in 1931 there were 805 deaths per 1,000.000 population in this country due to food poisoning. In the previous year (1930) there were 77. In 1929 there were 840. This gives you the general idea of the yearly figures. How many of these applied to the Navajos? I would venture to say, practically none. Stanley Dixon, Public Analyst, for the city of Cardiff, Wales, in an address on "The Relation of Food to Diseases," said that one of the causes of food poisoning was chemical poisons of non-bacterial origin "resulting from modern food processing on a huge scale making the food more attractive to the eye but unquestionably less adapted to body needs." He says that "The chemical poisons may be simple inorganic substances which gain access from carelessness or through faulty methods of preparation or manufacture of the foodstuffs." They may even be deliberately put in the food to make it keep longer, taste better or for some other reason that puts more dollars in the till of the food processor.

More detailed investigations are warranted, by vitamin studies and otherwise of the foods of the Navajo, of the methods he employs in growing them, of the kind of fertilizers he uses, of his methods of processing them.

A famous English surgeon, Dr. Tipper, wrote a book in which he described the life of the Bene tribe of West African negroes which he studied over a period of twenty years. These people were completely free from cancer, appendicitis and most of the other diseases of civilization. The Bene negro, says Dr. Tipper, pays particular attention to the proper growth of his food. While they eat some meat, they attach great value to the eating of vegetables. Their foods are not canned, nor put through factory processes that devitalize them. They use no poisonous preservatives such as we freely employ. He mentions cases of some of the Benes who went to the coast to be educated or to work on jobs, and who ate the white man's food. Soon their health degenerated and appendicitis, gastritis, stomach ulcer and cancer put in their appearance.

Weston A Price, a medical scientist of wide renown, spent many years among primitive peoples all over the world studying the connection between nutrition and caries. The results of this valuable work are contained in a remarkable book called *Nutrition and Physical Degeneration,* published by Hoeber. His findings coincided with those of Dr. Tipper. Where people ate natural, unadulterated foods raised on fertile soils, there was a notable absence of all the diseases of civilization, including cancer.

He mentions the case of the 2000 inhabitants of the Loetschental Valley in Switzerland. Price says they have no physician nor policemen and not even a jail. The famous Vatican guards in-

clude many natives of this valley. Says Dr. Price, "Notwithstanding the fact that tuberculosis is the most serious disease in Switzerland, according to a statement given me by a government official, a recent report of inspection of this valley did not reveal a single case." Price studied their foods which he tested for their mineral and vitamin contents. He found them to be high in vitamins, "much higher than the average samples of commercial dairy products in America and Europe, and in the lower areas of Switzerland." Switzerland has a much higher cancer rate than we have, but the figures of chemical fertilizer usage show that Switzerland is far ahead of us in this respect. However, the chances are that this modern product has not yet penetrated into the isolated Loetschental Valley because of its isolation and inaccessibility.

In my book *The Healthy Hunzas,* it was shown that this primitive race, the Hunzas, that live in the most northerly tip of India, surrounded by Afghanistan, the U. S. S. R., Sinkiang and Tibet, are a most healthy people. Sir Robert McCarrison, the famous English medical research scientist who investigated the Hunzas over a period of about eleven years found them so vibrant of health that he reported never having seen a case of asthenic dyspepsia, or gastric duodenal ulcer, of appendicitis, mucous colitis or cancer among them. Cases of oversensitivity of the abdomen to nerve impressions, fatigue, anxiety or cold were completely unknown. McCarrison in November 1921, delivered the Mellon Lecture at the University of Pittsburgh, entitled "Faulty Food in Relation to Gastro-Intestinal Disorders" and its salient points centered on the marvelous health and robustness of the Hunzas.

McCarrison was amazed at the health and immunity record of the Hunzas, who, though surrounded on all sides by peoples afflicted with all kinds of degenerative and pestilential diseases, still did not contract any of them. He said:

"Indeed, their buoyant abdominal health has, since my return to the West, provided a remarkable contrast with the dyspeptic and colonic lamentations of our highly civilized communities." He said that their perfection of physique and great physical endurance are attainable on the simplest of foods, provided these be of the right kind. The Hunzas are known to farm in a manner superior to all the surrounding peoples. They put back in the soil every bit of organic matter they can find. They never burn manure as a fuel, as do the neighbor Nagyars across the river from them who are afflicted with goitre and cretinism.

Looking back on McCarrison's great lecture at Pittsburgh in 1921, I now recall that I was in that city at the time, was twenty-three years old and working as an accountant on an audit of the books of the Allegheny Steel Company, but it was not till about 1941, twenty years later that I first heard of the work of Sir Albert Howard and McCarrison. Would that I could have been present at his lecture!

(to be continued)

Friends of ORGANIC GARDENING Can Help Build Circulation By Handing Out Free Subscription Booklets

Organic Gardening is constantly striving to increase its subscription list. It is important that we tell as many people as possible about organic gardening. Perhaps you would like to take an active part in this important program by handing out our subscription booklets to friends, neighbors and acquaintances in your community. If you would like some extra money, this spare-time activity will return liberal commissions. The booklet will induce your prospect to subscribe. Through a coded coupon we can trace each subscription to your efforts.

SEND FOR FREE BOOKLETS Write to Organic Gardening, Dept. Q., Emmaus, Pa. We will be glad to send you 25 or 50 booklets. State the amount you want.

The Fireplace can be continued as the center of interest in your living room throughout the summer by replacing the glowing flame with flowers in season from your garden. Ivy is planted in a brass kettle and allowed to grow naturally over the logs placed on the andirons on the hearth. In the old stone jar are evergreen huckleberry, snapdragons, and roses, the latter occupying the focul point. The flowers which change from week to week reflect the ever changing flame of the burning logs which represent the summer suns of long ago.

—Mrs. William H. Eyster.

The Ideal Compost

By DR. EHRENFRIED E. PFEIFFER

IN the following, the ideal compost analysis is discussed. The data are based on actual analysis of quite a few compost heaps which have been brought to the attention of the Biochemical Research Laboratory of Dr. E. Pfeiffer.

When we speak of "ideal" we mean a combination of various factors which together render the compost alive and with good fertilizing value.

1. STRUCTURE: The material should be medium loose, not too tight, not packed, and not lumpy. The more crumbly the structure, the better it is.

2. COLOR: A black-brown color is best; pure black, if soggy and smelly, denotes an unfavorable fermentation with too much moisture and lack of air. A greyish, yellowish color indicates an excess of dead earth.

3. ODOR: The odor should be earth-like, or like good woods soil or humus. Any bad smell is a sign that the fermentation has not reached its final goal and that bacteriological breakdown processes are still going on. A musty, cellar-like odor indicates the presence of molds, sometimes also a hot fermentation, which has led to losses of nitrogen.

4. ACIDITY: A neutral or slightly acid reaction is best. Slight alkalinity can be tolerated. One has to keep in mind that too acid a condition is the result of lack of air and too much moisture. Nitrogen-fixing bacteria and earthworms prefer the neutral to slight acid reaction. The pH range for a good compost is, therefore, 6.0 to 7.4, 7.0 being neutral. Below 6.0 the reaction is too acid for the development of nitrogen-fixing bacteria. Under certain circumstances, a reaction of 5.5 is required, for instance for potatoes, azaleas, rhododendrons, alpine flowers. In this case, one puts no lime, or very little, in the compost and increases the amount of woods soil and leaves as well as of conifer needles.

5. MIXTURE OF RAW MATERIALS: The proper mixture and proportion of raw materials comprise one of the most important factors. Indeed, it determines the final outcome of a compost fermentation and the fertilizer value of the compost. We have analyzed compost heaps with as low an organic matter content as 8% which is only a little more than that of good humus earth (5%), and we have had heaps with as much as 60%, even 80%, organic matter. In the latter case, frequently a hyper-humus or peat base had been used. On the average, we feel that an organic matter content of from 25 to 50% should be present in the final product. This means that one to two-thirds of the original material ought to be organic matter: leaves, garbage, weeds, manure. The balance should be made up of earth, old rotted compost and lime. As far as the earth used is concerned, good topsoil is preferable. If dead or mineralized soil and subsoil is to be used, that which has frozen out over winter secures better results. Ditch scrapings, or soil from the bottom of a pond, are better frozen and exposed to air for a season, before being incorporated into a compost.

6. MOISTURE: Most of the composting failures we have seen, have resulted from the proper moisture conditions not being maintained. There is one simple rule: maintain a moisture content like that of a wrung out sponge. That is, no water should drip from a sample squeezed in the hand. But, by all means, do not let the com-

post get dry. This stops fermentation. No bacteria and earthworms can live without moisture. Too dry a condition leads to heating up, mold formation, to losses of nitrogen and finally to a complete cessation of fermentation.

7. POTASSIUM: The potassium content depends upon the original content of the earth used as well as of that of the plants used in the heap. Up to 5% of the mineral content of plants consists of potassium. The more organic matter one uses in a heap the more potassium one will have. However, potassium is easily soluble and can be washed out by rain. The original material should not be scattered around, exposed to the weather, but incorporated in the heap at once. If the heap itself is exposed to drenching rains it will lose potassium. Fresh cow manure contains 11 lbs. of potassium per ton. We take this as a guide and use the following specifications: 14 lbs./ton, very high; 12 lbs./ton, high; 8 lbs./ton, medium; 2 lbs./ton, low. Most of the samples received have been in the medium range. If potassium is low we advise increasing the organic matter content. Liquid manure is very rich in potash.

8. LIME: Usually there is not too much natural calcium in the original material, except when bone meal is used. Lime is added. A difficulty in the analytical procedure is that of sampling. Sometimes the composts contain lumps of lime which we discard, accounting only for the "digested" or absorbed fraction of lime. Nitrogen bacteria need lime, but not lumps, which are too alkaline (when coming in touch with moisture). Frequently, such lumps will lie inert in the soil afterward too. The use of finely powdered lime and its distribution over the heap so that no lumping occurs are important.

Cow manure contains about 10 lbs., sheep manure 17 lbs., and poultry manure up to 55 lbs. of lime per ton. Our scale for compost is: above 20 lbs./ton, extremely high; 15 lbs./ton, very high; 10 lbs./ton, high; 5 lbs./ton, medium; below 5 lbs./ton, low. The average compost contains 5 to 10 lbs./ton. Considering the fact that about 8 to 10 tons of compost are applied per acre, the 50 to 100 lbs. of lime contained in the compost would not represent a complete lime supply for fields according to the average rule of 1 ton of lime/acre. But it is enough to give the nitrogen-fixing bacteria a stimulant.

9. MAGNESIUM: Many soils are low and even deficient in magnesium. The soil fraction of a compost earth is, therefore, low. Most of the magnesium derives from green leaves, for here magnesium is combined with the chlorophyll. The use of green garbage and leaves in a compost heap is thus important as a magnesium supply. Also the use of dolomite in place of lime would increase the magnesium content. Cow manure contains on the average 2 lbs./ton of magnesium, horse manure 3 lbs./ton, sheep manure 4 lbs./ton, poultry manure up to 16 lbs./ton. Our scale is: Above 4 lbs./ton, very high; 2 lbs./ton, high; 1 lb./ton, medium; below 1 lb., low. On the average, composts do not have too high a magnesium content, except when dolomite, sheep or poultry manure is used. Most of the samples we have tested were medium to low.

10. NITRATES: These are derived partly from the decomposition of proteins, from the use of good topsoil, from the addition of manure and—if everything goes well—from the activity of nitrogen-fixing bacteria during the fermentation. The latter work only at the described slightly acid to neutral reaction, and if the fermentation is aerobic and the heap does not heat up. As long as there is a hot fermentation no fixation takes place. Sometimes older heaps with well-rotted material still increase in nitrogen content. Cow manure contains 7 lbs./ton of total nitrogen (nitrates and ammonia), horse manure 13 lbs./ton; liquid manure 6 lbs./ton, sheep manure 19 lbs./ton, and chicken manure up to 34 lbs./ton. Our scale for nitrate nitrogen is: Above 18 lbs./ton,

extremely high; 14 lbs./ton, high; 6 lbs./ton, medium; below 3 lbs./ton, low.

To maintain or increase the nitrogen by bacterial action: this is the ART of composting.

11. AMMONIA: Under unfavorable conditions, the ammonia fraction is higher than the nitrate fraction, especially in the beginning of composting and if fresh manure is added. Ammonia nitrogen is frequently lost and we, therefore, do not favor a high ammonia count. Little or no ammonia is preferred in a good compost heap. Too much lime and too great an alkalinity favor the losses of nitrogen via ammonia. Putrefaction instead of fermentation also increases free ammonia. The heap has a typical smell which tells the composter at once that something is wrong. Our scale is: little or no ammonia in a good compost.

12. PHOSPHATES: A distinction must be made between available (soluble) phosphates and unavailable phosphates. In general, we determine only the available fraction. The "total" phosphate would also contain the unavailable fraction, but one does not know how much of this will really be used for plant growth. In order to receive a quick result from compost application only the available fraction counts. If the material is rich in colloidal humus and clay, it is possible that the unavailable fraction is stored and made available to plant growth in the course of time. The presence of calcium with phosphates is a means to balance the available fraction together with a rather neutral fraction. According to the rule calcium and phosphate should balance, but in practice we frequently find an irregular proportion of calcium and phosphate. It would take us too far afield to explain here why this is so. Cow manure contains 6 lbs./ton phosphoric acid, sheep manure 15 lbs./ton, liquid manure very little (except where phosphates are used on the barn floor and in the gutter), chicken manure up to 34 lbs./ton. Our scale is: Available phosphate 15 lbs./ton, extremely high; 10 lbs./ton, very high; 6 lbs./ton, high; 4 lbs./ton, medium; below 2 lbs./ton, low. Many composts we have analyzed were medium to high.

13. MANGANESE: Manganese might be present in soils and plants. However, most of the soils we have had were low or deficient. Without the addition of manganese to the compost we doubt that a high manganese content can be had. When we speak of "high" here, of course, a trace is meant. The same is true for other trace elements, such as zinc and boron. The contents of these are usually expressed in parts per million, and 30 parts per million would already represent a respectable count. One must bear in mind that trace elements are beneficial to plants only as "traces", not in bulk. 30 ppm of boron in a soil already borders on the dangerous content. Since compost is not used straight, but is distributed over a wide acreage, 10 tons/acre for instance, a content of 300 ppm would not be objectionable in a compost.

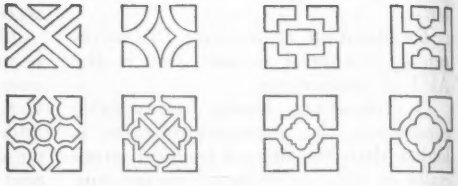
14. SULPHATES: Free sulphates in connection with acidity mean the presence of sulphuric acid, which by all means should be avoided. The sulphate content, therefore, means one thing if the reaction is neutral, and quite another thing if the reaction is acid. Usually very little if any sulphates are found in compost.

15. NITRITES: These are the expression of an unfavorable breakdown of organic matter (protein) and should be avoided if the compost is to turn out well. The nitrite nitrogen is usually lost. With proper composting methods we have rarely encountered nitrites.

16. CHLORIDES: These come in only with sea water, heavily chlorinated water, or sewage water, and are usually not found in compost.

17. IODINE: No information has been obtained as to the presence of iodine in compost. It is possible that rain in the neighborhood of the seashore may contain iodine. Plants do not contain iodine, but manure may. Where milk residues or water from whey is used in compost, some iodine might be present.

Herb Garden Designs



LUSH HERBS

When Organically Grown

By

ELEANOR FOSTER CHALFIN

MANY true statements have been made about poor soil producing herbs with the best quality of leaf. The volatile oils which give a distinctive taste or aroma to each herb, do seem stronger when the plants are grown in ground that has had lime, only, added as nourishment. But, on the other side of the picture, when soils are rich with organic matter, herb plants grown by this method have so many more good points, that it is worthwhile considering this recommendation.

Herb gardeners do not toil over their plots of these friendly, lovable plants for the sake of the leaf harvest alone. Gardeners, as a whole, are notorious for their pride in raising large, sturdy specimens in any category. And justly so. Vegetation that is verdant and vibrant, flowers or fruit that are larger and brighter, are so soul-satisfying to any beholder. These two factors are more important, when raising herbs, than is often realized. In most cases, herbs have rather unshowy flowers while their foliage has interesting shades and shapes and often textures, too. As illustration: the blue-green of Rue's scalloped leaves; the gray of Wood-betony's velvety leaf; the vivid yellow-green of Burnet's picoted foliage. So, robust herb plants will not only add unique accents among the other flora of border or vegetable plot but will repay in quality as well.

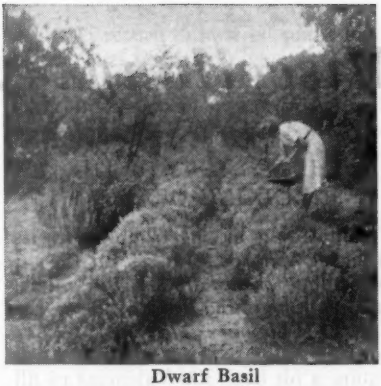
Herb gardeners do not labor over their plots of these tasty, pungent plants for the sake of their beauty only. Where leaf is harvested for seasoning, either fresh or dried, the larger yield far outweighs the infinitesimal difference in the tang and taste of each specific variety. Many herbs, such as Anise, Caraway, Fennel and Sesame, produce seeds that are used

for flavoring foods. Here also, fullest measure is obtained from more vigorous herbs and the seeds are much larger. It stands to reason that a plump plant will produce more seed and of better quality, than one which is stunted and weak. Thus, organically grown herbs are worth their weight as quantity always counts.

As for the fragrant herbs, it is very difficult to detect any lessening of their sweet scent when they enjoy rich loam instead of struggling in poor soil. One small sprig from Lavender, when compared with another sprig of the same variety, but grown under the two different conditions, may show a slight change. However, when each stem on a plant yields larger sprays and bigger blossoms, the multiplied effect tends to magnify the aroma rather than diminish it. Thus, abundant growth releases more perfume.

Another angle, and an important one, in this horticultural debate is also on the affirmative side. A healthy plant resists disease. Few herbs harbor pests because their scent discourages them but they can aid other plants by being grown with them. This cheek-by-jowl arrangement drives away garden bugs and attracts the bees. Summer Savory sown in a row next to snap beans will lessen, and often cancel, the spraying for beetles. These two products are true affinities in cooking as well, so they make appropriate garden companions. Basil, the tomato seasoning herb, is another instance in which the vegetable half of the combination is helped in both cooking pot and garden plot for it has been known to help the wilt disease of tomatoes. Borage and Bergamot, both bee foods, add astonishing attraction by placing near strawberries and other plants needing extra pollinating.

Herbs are grown for their three assets that feed the senses of sight, taste and smell. These dividends, paid generously by herbs, place them in a distinct class by themselves. In this magazine no rebuttal is necessary in the case of rich soil versus poor soil. There can be no negative side when lush herbs pay extra dividends.



Dwarf Basil

Sweet Fennel

French Lavender

Miscellany.....

THE MYSTERY OF THE SHRINKING ORANGES

California is having trouble with its shrinking Valencia oranges. In 1945 it took about 254 oranges to fill a box. In 1946 it required 264 to fill up the same sized box, in 1947, 276; 1948, 277 and it is estimated that in 1949 it will require a bit over 300 Valencias to fill the box. The orange today is not much larger than a golf ball. 149,000 acres of Valencias are threatened. Scientists of the Citrus Experimentation Station at Riverside, California are somewhat confused about the cause. There are dozens of theories, among which are smog, bad Colorado River water, sunspots, and the New Mexico atom bomb explosion. Some even go so far as to state that the soil may be worn out. If the authorities will visit the groves of the few organiculturists in California they might discover the real solution to their problem. I would suggest that they contact Herbert Clarence White of Paradise, California.

•

PRESIDENT TRUMAN SUBMITS HEALTH PLAN

This plan is estimated to cost six to seven billion dollars per year, taxing payrolls, 1½% to employer and 1½% to employee. If, before engaging on such a tremendous program, the Government would take the same amount of money and see to it that every bit of industrial organic waste, garbage, etc. is given back to the land from which it originated in properly composted form, perhaps we would not need socialized or any other kind of medicine. First things first. Why indulge in the second step before the first step is taken? Think how much compost could be put back on the land each year for six billion dollars! Imagine what that would do for the dust bowl! Schiller, the poet, once said:

"Against stupidity the very gods
Themselves contend in vain."

•

SEED TREATMENT

Eighteen farm products of the U. S. Rubber Co. were banned for sale in the State of Georgia, says an Associated Press dispatch of May 12, 1949. "The step followed an all-day hearing in which farmers and seed dealers charged that thousands of acres of seed peanuts had failed to produce plants this year. They blamed Spergon W-P, a U. S. Rubber Co. chemical seed treatment, for heavy losses in Georgia's 85 million dollar peanut belt."

The question is put to us by readers every day. "Shall we treat seeds?" Our invariable answer is "no." Give your seed a happy home and it will thrive.

•

DOES DDT POISON PEOPLE?

Robert E. Geiger, in the Seattle Times of May 8, 1949 writes an article entitled "Experts Discount Food-Poisoning Dangers in Powerful Insecticides." He says: "Are Americans slowly being poisoned wholesale by powerful new insecticides scattered over thousands of acres? No, say government experts—but if you are a farmer be careful how you handle these new bug killers."

He says further "Dr. Rohner and other government experts say that up to this moment there is not a single grain of evidence to indicate that the use of one of the new insecticides, according to directions, has caused human sickness or death." This worthy doctor evidently did not read the Journal of Digestive Diseases, in a recent issue of which Dr. Morton S. Biskind

of New York said, "Evidence is presented that the new syndrome (set of symptoms) widely prevalent in the United States for more than two years and attributed to infection with a hypothetical 'virus X' is in reality due to DDT poisoning." In more than 200 "virus X" cases, Dr. Biskind has found evidence of exposure to DDT. The "X disease" in cattle, reported to have caused serious losses among cattle in 26 states, bears a close resemblance to the effects of DDT poisoning.

Coming back to Geiger's article, he says they have been experimenting with the effects of DDT on rats and have found that "there is no outward damage to the rats, but if they are killed and their organs examined, small but significant damage to the liver can be seen." Also "If the rats' diet is reduced or they become ill their bodies begin drawing on the fatty tissues. This may act like a 'trigger' on the stored DDT. It may be released into the blood and cause poisoning."

There is other damaging evidence in Geiger's article, but why go further? How about this item from the September, 1948 issue of the U. S. News and World Report:

"Some soil chemists in the Dept. of Agriculture have doubts about recently developed 'Wonder' insecticides. The insecticides permit higher crop yields for a year or two, but the scientists find that repeated use damages the soil, perhaps permanently."

•

FERTILIZER THEORY CHANGE

In a laboratory at Washington State College experimental work is going on with radioactive plant experiments in cooperation with the atomic energy commission. According to the Sunday *Oregonian* of May 8, "Dr. Orlin Biddulph, professor of botany, has found that living plants have a circulatory system comparable to the blood circulation system of animals.

"Plants have been thought to have two "flow" systems, he said. One was believed to carry water and minerals from the roots to the leaves and the other to return "prepared plant food" from leaves to plant cells.

" 'Dr. Biddulph has found that minerals are not just swept up with the water, but are re-circulated from root to leaves and back again,' Hatch said. 'There may be three or more complete circuits in a day.'

"The discovery discounts the theory that fluids move in plants by absorption—like a blotter soaking up water.

" 'The trouble with the old absorption theory,' Hatch said," is that Dr. Biddulph finds the movements of liquids is about 15 times faster than mere absorption would indicate.'

" 'The findings,' Hatch said, 'could change our whole idea of the use of fertilizers.' "

Let's watch this laboratory.

•

MEDICAL HELP

Here is an interesting item which appeared in the January 6, issue of the Engineering News Record:

"New support for the idea of using sewage sludge and garbage for fertilizer comes now from the medical profession which believes that artificial fertilizers do not impart enough of the minerals that promote body growth and combat so-called deficiency disease, such as arthritis. Johns Hopkins University sanitary engineers are seeking to evaluate the kind and amount of minerals in sewage sludge. The success of their endeavor would make the processing and sale of such sludge by municipalities more attractive than it is now."

Yet, Consumers Union Reports for February, 1949 said that the organic method of farming tends to accent the tendency toward deficiencies of mineral elements in the soil. Phosphate rock, which organiculturists use, contains over twenty valuable rare trace mineral elements.

•

AND NOW FLOWERS

I don't know what we would do without the Associated Press. Now

they tell of Robert H. Roland, of the Society of American Florists, appearing before a senate committee on April 29 and stating that dangerous viruses are destroying such flowers as the gladiolus, carnations and chrysanthemums. He pleaded for a $50,000 appropriation for the Bureau of Plant Industry so it can do some research on this problem. Now, flowers aren't even safe from the dangers of the chemical methods.

This reminds me of my trip to Opelika, Alabama, to make a speech, about seven or eight months ago. On arrival, I hadn't been in my hotel room for more than ten minutes when a bellboy brought in what appeared like a cart-full of the most gorgeous gladiolus. The ticket said, "From the Opelika Floral Company, grown by the organic method." I checked up later by inspecting their hot-houses. The use of well made humus did away with their need for spraying. Mr. Robert H. Roland, please visit these people and discover how to solve your problem without spending the taxpayers' money.

And yet, in the March *Flower Grower* there is printed an item which says that "the organic nitrogen in barnyard manure, blood tankage and other high nitrogen fertilizers is more of a hindrance than a help" in growing the gladiolus and the narcissus. If these organic products are composted we have been able to get excellent results with the gladiolus and the narcissus. Do not fear to grow these two flowers with compost.

•

ORGANIC BANK

Readers may have been surprised to see the following advertisement in the April issue of *Organic Gardening*:

BANK WANTED

A banking depository within a reasonable distance of Emmaus, Pa. is desired by

the Organic Gardening Magazine

with which to bank by mail. A bank is desired that makes no charges for handling the account. We receive many small checks and the charges made by banks in this area amount to a considerable sum each month. Is there some banker who would like to handle ORGANIC Money?
ORGANIC GARDENING EMMAUS, PENNA.

Through the kind offices of Clarence B. Fargo, one of our advertisers who makes wood veneer plant bands for starting seedlings, we were able to make a connection with the Union National Bank of Frenchtown, N. J. of which Mr. Fargo is vice-president. We send our deposits through the mails. It's a small world after all. Through the whole affair I became personally acquainted with Mr. Fargo who is an asset to the field of horticulture. Incidentally the saving to us, in dollars, will be considerable. We received over twenty replies to our advertisement. Advertising pays!

•

MR. JOSEPH FRAZER

One of the highlights of the month was the visit to our experimental farm of Mr. Joseph Frazer of Kaiser-Frazer automobile fame. As already announced in a previous issue, Mr. Frazer is embarked on a huge project to turn the wastes and residues of country and city into compost, by a five-day digesting process using cultures of bacteria to hasten the breakdown. The entry of Mr. Frazer into the field of organic farming and gardening has given a great boost to the movement. Now, certain interests who were skeptical before, are making noises as if the organic method may have a scientific basis. One journal read by persons who use chemical fertilizers, in commenting on the new Frazer method, said that it looks all right but that the fertilizer manufacturers need not worry, for it would take a hundred years until organic fertilizers made by such a process would be available for all who want it.

I wouldn't be too sure!

•

READING REPORTS

Thanks to our readers who continue to send in pertinent clippings from their newspaper and magazine reading. Without them this department would not exist.

J. I. RODALE

EARTHWORMS

Q. How do I start breeding earthworms?

A. You ought to start reading some of the literature on the subject. We have for sale *Our Friend the Earthworm,* $1.00 and *The Formation of Vegetable Mold Through the Action of Worms,* by Charles Darwin, 60c. It is best to purchase some breeder earthworms from one of the many advertisers in *Organic Gardening* or the *Organic Farmer* magazines to start. They usually furnish the necessary instructions how to breed them.

Regular Earthworms Not for Breeding

Q. May I use the regular earthworm that I find in the garden or in the field for breeding purposes?

A. No. This type will not be content as a rule to live in the shallow places and concentrated materials usually employed in earthworm breeding. However, if you can obtain earthworms from a manure pile (called brandlings), this type can be bred in the artificial conditions of the earthworm breeder.

Hybrid Earthworms

Q. Is this type of earthworm a hybrid obtained by crossing the manure worm with the orchard worm?

A. So it is claimed but we doubt it. However we believe that this type of worm, sold by the breeders, by generations of living under artificial conditions, may have become more hardy for such purposes and much more desirable than a brandling straight from some manure heap. From that point of view it may be a creature apart, a "hybrid."

Introducing Worms Into Fields

Q. Can you introduce the reddish hybrid earthworm, or the earthworm of a compost heap into a field or orchard?

A. They will live there only until the compost or raw materials in which they have been working disappear. I would not count on their survival, but their dead bodies will enrich the soil. Earthworms do not like to be shifted from one kind of soil to another. The material being transformed by the hybrid earthworms is excellent feeding for the bluish soil earthworms, sometimes called the orchard worm. If a compost heap is almost transformed, the bluish earthworms may migrate into it. In moving earthworms from one place to another some of the soil that the earthworms are raised in must accompany them, otherwise they will die. In about two weeks earthworms can acclimatize themselves to a new location in this manner.

Q. My earthworms in the breeding boxes seem to be turning pale.

A. Perhaps it may be due to a lack of protein content of their food. Include some ground-up wheat or barley and alfalfa meal, or finely ground up beans.

Forest Soils

Q. I have come across land, once a forest, that has never been plowed, and is now covered with medium sized hard-wood trees. The ground is rich, yet I dug in a number of places, however, no worms were found. Do worms have to be planted in this ground, or would you say the ground lacks something?

A. There is a logical reason why forest soils do not contain earthworms. In a great many cases it is because forest soils are acid, and earthworms must have a neutral or alkaline medium to live happily. That is why chemical fertilizers kill them or drive them away. They are so acid.

Nature has many tricks up her sleeve, so that in the forest she is more dependent on bacteria, fungi and other organisms for breaking down organic material.

Just keep working in plenty of compost and the earthworms will gradual-

ly come. You might try to transplant a quantity of field worms from another place.

Q. Will the drying up of the soil kill the earthworm immediately?

A. No, the earthworms may burrow deeper, finding sufficient moisture at a lower depth, or they may remain in the less moist soil, if the drying-out process is a slow gradual one.

In the latter case, the earthworms literally shrink, as the moisture in their bodies decreases, but they will regain their former size gradually upon restoration of moisture to the soil environment.

Egg capsules often survive a drying-out process that is fatal to the earthworm colonies. The capsules will hatch and develop when the normal condition of dampness is restored.

Q. How long will an earthworm live outside the soil?

A. No more than a few moments if they are exposed to the drying effects of the air, although they can be kept alive in water for a number of hours.

Q. Do the earthworms continue their work during the winter below the surface of the ground that may be frozen?

A. During the time that the ground is frozen, the earthworms' activity is considerably decreased, but undoubtedly continues below the frost line.

Q. How long does an earthworm live?

A. To date, there is little actual information as to the life span of earthworms, but observations indicate a life expectancy of several years.

Q. Would the earthworms have any effect on heavy adobe (clayey type) soil?

A. Earthworms will gradually build up any kind of soil, even clayey type if you will put plenty of compost in with them.

Q. If earthworms are cut with a spade do they die? It is almost impossible to avoid cutting a good many.

A. Earthworms that are cut with a spade sometimes recover, that is, one part of them may or may not recover. The other part will die. However, there is not a total loss, as their decaying body in the soil is of help.

Q. Is a power gardening cultivator harmful to earthworms?

A. It may kill a few but their dead bodies will enrich the soil. They do such a wonderful job of thoroughly distributing compost in the soil that they are highly recommended.

Q. Is any climate suitable for breeding earthworms?

A. Yes, but the warmer the room where their boxes are the better they will breed.

Q. Are wood ashes harmful to earthworms?

A. No, on the contrary, they help, but should not be used in too great concentrations. Coal ashes, however, are bad for them. Do not use fresh manure in an earthworm bed unless thoroughly mixed with top soil and green matter reduced fine and decayed a little. Ground limestone (not hydrated or slaked) will not hurt earthworms, but it must be of small amount and thoroughly mixed in the material before it comes in contact with the worms. Earthworms love a sprinkling of coffee grounds. Even mild acids kill earthworms. Vinegar kills them instantly. Do not use eucalyptus or English walnut or pepper leaves.

Q. Can earthworms be used in potted plants?

A. Yes, unless the pots are too small. You must be sure food is included for them (compost), and that the pot does not get too dry or hot. It is only when there is a lack of food that they will attack plant roots. Actually they make the soil more porous and permit a more vigorous root development.

Even begonias can be grown in pots with earthworms.

Earthworm Eggs or Capsules

Q. I would like to know something about earthworm eggs and what they are like. When I turned the compost heap, that I made this fall, I noticed quite a few whitish eggs a little over ⅛ of an inch long, in one part of the heap.

A. The whitish eggs are larvae from flies. The earthworm egg is really not an egg, but an oval—yellow—gelatinous capsule, containing 3 to 12 earthworms. It is usually about ⅛ of an inch in diameter.

Q. How many egg capsules does an earthworm make in a year?

A. Under normal conditions an earthworm will produce an average of a capsule per week.

Q. How long does it take the egg capsules, or cocoons to hatch?

A. Approximately 3 weeks, depending upon climate, moisture, species of earthworm, etc.

Q. Where are the egg capsules of the earthworm deposited? Are they found among the castings just above their holes in the ground?

A. Earthworm capsules are deposited lower in the ground and are not found among the castings.

Q. What is meant by earthworm spawn?

A. Spawn is the culture that earthworms are bred in.

Q. Can egg capsules be moved from one place to another without any soil?

A. Yes. Wherever they hatch is their native habitat. With earthworms themselves it is difficult. Egg capsules can be inserted into compost heaps.

Q. What is the best medium for raising earthworms — boxes, heaps, pits?

A. They all have their place, depending on conditions. If a pit or old cistern is used it must provide for drainage to prevent water-logging. For warm weather outside heaps may be satisfactory. Earthworms will stay where there is a supply of food. But for outside breeding we like either a cement pit with sides less than two feet above the ground. We suggest that you get this type of information from our booklet *Our Friend the Earthworm*, $1.00, or from earthworm breeders.

Uses of Earthworms

They can be placed in garden soils where there is an oversupply of unfinished compost, or raw organic matter. They can be used to feed chickens. For winter time making of compost in cellars they are excellent. In such case mix all your ingredients thoroughly before inserting earthworms and be sure to use a little topsoil.

Earthworms are valuable to make compost without turning the heaps or material in pits. Assemble the material but wait till the heating goes down before putting in the earthworms. This takes about six weeks. We do not recommend breeding earthworms for the purpose of placing in farm lands. Instead use plenty of compost. Earthworms will then make a voluntary appearance.

Chemical fertilizers, poison sprays, DDT and 24D kill earthworms.

Conn. Agr. Station Findings

In 1942 H. J. M. Jacobson of the Connecticut Experiment Station compared the composition of earthworm castings and uncontaminated soil from the farm of Christopher M. Gallup at North Stonington and found that the castings contained over four times the amount of nitrate nitrogen, seven times the available phosphate, eleven times the replaceable potassium and 1.55 times the humus content.

•

Dish Water

Do not use dish water in earthworm boxes, heaps or pits.

Ground Moles and Their Control

By DR. PAUL SCOTT

GROUND moles, like other soil organisms, are too little understood by the average person. It is because we know so little about moles that we seem to be unable to control them. Some gardeners report that they can control them by growing castor bean plants in the garden, or by putting seeds of castor beans in the mole's runways. This method of control has been tried by others and found to be ineffective. This is understandable when we realize that moles do not eat plants of any kind but live entirely on such animals in the soil as insects and earthworms. In captivity, moles will eat their weight in meat per day. They will not eat grains of any kind. Any effect that castor bean plants may have on moles must be indirect. For instance, the castor bean plant develops a large root system as do most fast-growing plants which require large amounts of water. It reduces the water content of the soil to such an extent that there are no pests, no earthworms, and, therefore, no moles.

Moles do not eat garden seeds and bulbs, although they are often blamed for doing so. If moles make their runways in the rows of plants in the garden it is because there are more moisture, more insect larvae and earthworms in the rows than between the rows. The moles are looking for insects and earthworms to eat. The real culprits responsible for eating the seeds are mice, rats, gophers, and other seed- and plant-eating animals. In making a runway beneath a row of plants, however, moles will damage plants by admitting air around their roots.

Poisons for Killing Moles

Moles cannot be controlled by the use of poisons advertised for this purpose. Remember, the principle diet of the mole consists of insects and earthworms. Moles will not live in soil in which these soil organisms do not occur. Moles will not eat poisons that may be placed in their runways. When the use of poisons seems to be effective, the user has either (1) frightened the mole out of his present runway by the scent or other quality of the poison used, or (2) killed the food upon which the mole feeds; but he has not killed the moles. In such circumstances, the moles go into their lower systems of runs, and after the next rain, will make new runways near the surface where the worms have again made their appearance. The abandonment of the surface runways by the moles gives the illusion that the poison had killed the moles. Anyone who has had experience with moles will tell you that the moles which were thought to have been killed by the poison will return at some later time.

Gas for Killing Moles

Killing moles with gas seems impractical. Gas penetrates earth very slowly and the humus in the soil tends to absorb large amounts of the gas, thus protecting the moles from its lethal effects. Moles have a keen sense

of smell and lose no time in getting away from gassed areas of soil. Gas probably does more damage to the soil by killing beneficial organisms than is done by the moles.

How to Control and Destroy Moles

A pair of moles produce four young each year. The young are seldom observed until they are practically full-grown. In the middle western states the young are born in April, and are fed in the nest until sometime in June. When the young begin to run in June, a sharp increase in the number of runways will be observed. The burrows are from a half to two inches in diameter, and are feed lines. Into these burrows crawl the earthworms and insects which are eaten by the moles. As a rule there is one family of moles for each set of runways and feed lines. In times of food scarcity, the runways of one family may be invaded by moles from a different family of moles.

Moles are kept out of the greens of golf courses by killing the soil organisms in the soil. This is accomplished by applying strong mixtures of lead arsenate or ammonium sulphate. A golf green having no earthworms or insects in the soil will not be bothered by moles. They burrow up to the green then stop. They burrow for food, not for fun. To make sure that moles will not damage your lawn or garden, you must destroy them. You may drive them away temporarily, but they will return when your soil contains their favorite food materials.

The surest way to eliminate moles is to destroy them. This can be done by using a choker loop type of mole trap, as shown in Fig. 1. Other types of mole traps have been devised, but none is as efficient as the choker loop type. This trap will work in lawns, vegetable gardens, and in any kind of soil. In setting the choker-loop trap, less attention need be given to conditioning the soil. The loops may be forced into the ground with the certainty that they will react promptly when the trap is sprung. Traps of this type will also stand up to the work better than any other type in heavy clay or gravel soils.

It is easy to set a choker loop trap. The two choker wires are pushed into

(*Please turn to page* 51)

The Soil and Health Foundation

THIS IS for the sake of new subscribers who haven't seen any announcements about the Soil and Health Foundation. This is a non-profit organization formed for the purpose of doing scientific research to prove to the agricultural world especially that the use of commercial fertilizers are harmfully affecting the foods they produce from a nutritional standpoint. It has been in existence for about a year and a half and is financing research to show that cancer can be prevented or reduced by eating food grown in a soil rich in humus. To join the foundation the contribution may be as low or as high as desired. All members are treated alike. No trustee or officer of the Foundation is permitted by the by-laws to draw a salary. Send contributions to:

THE SOIL AND HEALTH FOUNDATION
46 SOUTH WEST ST., ALLENTOWN, PA.

SWEET CORN for Summer's End

By WILLIAM H. EYSTER, Ph.D.

THERE is still time to grow sweet corn for the evening meal, corn roasts, and fraternity outings so popular during the closing weeks of summer. No food is more tasty and satisfying than a good variety of yellow-kerneled sweet corn pulled from the plants and cooked within the hour. In the latitude of New York City, sweet corn planted by July 10 has a good enough chance of reaching the eating stage before killing frosts to warrant planting in the home or market garden. Sweet corn is just a little bit sweeter when the kernels develop during the warm sunny days and cool nights of autumn.

The soil should be well prepared and enriched with well-fermented compost to insure a good food and water supply for the growing plants. This is important, as the rainfall during July and August is apt to be less than during the spring months. With enough humus in the soil, the dry sunny days of midsummer provide corn plants with a full complement of ideal growing conditions.

Corn's Origin Still a Mystery

Each corn kernel that you drop in the row, spaced about six inches apart, is a mystery hidden in the prehistoric past. For a time corn was believed to have arisen from a Central American teosinte, or perhaps as a hybrid between teosinte and some other unknown grass. Recently a kind of popcorn which is the principal food of the aboriginal population has been found

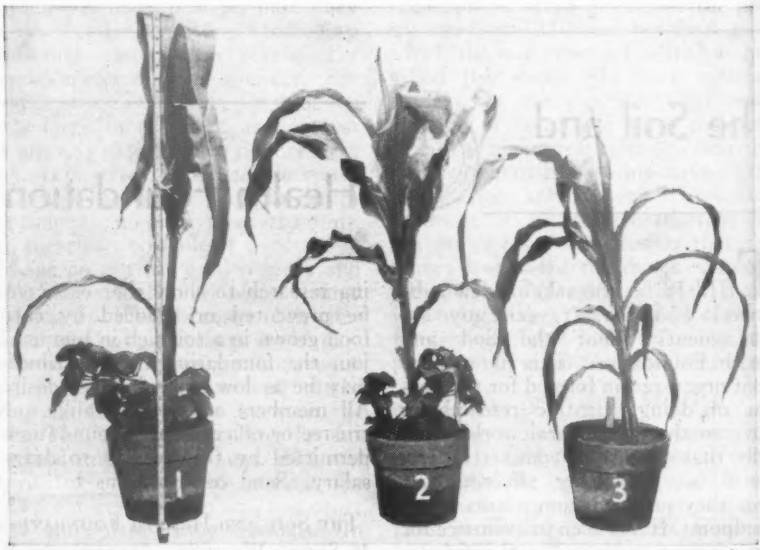
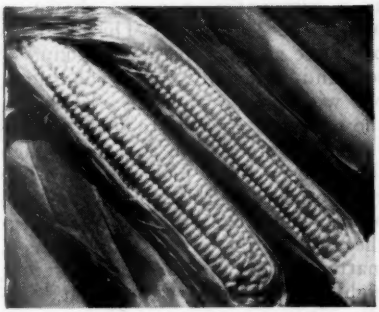


FIGURE 1

in the mountainous island of Madura, off the coast of Java. Then too, a variety of corn with waxy endosperm came from China. This corn is now grown extensively as a substitute for tapioca. Contemplation of these things tends to give us a fuller appreciation of what we owe to those who lived in earlier civilizations. What agricultural accomplishment of our time can compare with the origin of corn? Corn is genetically unstable and is forever undergoing changes. The corn we now grow differs widely from that used by the Indians. Sweet corn represents a mutational change from the Indians' corns. The endosperm of the kernel contains a mixture of sugars and starches rather than starches only, hence the name, *sweet corn.*

The kernels in the row should be covered with about one inch of soil. Under favorable conditions, the seedlings will appear within a week in July. Prevent weeds from growing in competition with the corn. This can be done by carefully executed shallow cultivation or by growing with the corn suitable companion plants.



Mixed Culture

Corn is regarded by many as the number one soil depleting crop. Grown in monoculture, the soil is clean cultivated and is exposed to the erosive forces of splashing rain drops and running surface water. By growing corn in mixed culture with soybeans, the yield of corn can be increased considerably and at the same time the soil can be built up rather than torn down. The greater and more vigorous growth of the corn when grown with soybeans

FIGURE 2

as a companion crop are shown in pots 1 and 2 in Fig. 1. The plants in pot 3 are growing in the same kind of soil and under the same conditions, but without the soybeans. Evidently the soybeans are able to share the nitrogen they get from the air through the nitrogen fixing bacteria which live symbiotically in the roots of the soybeans. Doubtless other legumes effect the corn in the same manner. As a matter of fact, in the days before our highly specialized Experiment Stations, it was common practice to grow butter beans and other kinds of beans as companion crops of corn.

The plants shown in Fig. 1 were again photographed about 10 days later with the growth differences shown in Fig. 2. Note that all the plants in rows 1 and 2 which are associated with the soybeans are taller, stouter, deeper green, and more vigorous than the plants in row 3 which were planted in the same soil and at the same time but without soybeans.

Do Not Remove the Tillers

Another point on which the Experiment Station specialists cannot agree is whether or not the tillers should be removed. Tillers are the secondary stems which sprout out from the base of the main stem of the corn plant. Tillers are sometimes called suckers, and this name probably reflects the general idea of some that the tillers suck growth vigor from the main plant. The fact is that the tillers carry on photosynthesis and serve as feeders to the main plant. They should not be removed, as cutting them off materially reduces the yield. The injury done to the main stem by cutting or tearing off the tillers also opens the way for parasitic fungi, a handicap which should be spared the corn plant. Experiments show that the removal of tillers may reduce the yield as much as from 15 to 20 per cent.

Placate the Japanese Beetles

In infested regions, Japanese beetles often attack the young developing corn ears and chew off the silks to such an extent that pollination and the subsequent setting of kernels are prevented. The beetles must and can be appeased even as politicians of foreign nations are appeased. This can be done by planting *odorless marigolds* in rows adjacent to the sweet corn in the garden. The Japanese beetles prefer the leaves of the odorless marigolds over the silks of sweet corn to such an extent that they will literally cover the marigold plants and avoid almost completely the corn. This has been done for two consecutive years on the Organic Gardening Experimental farm with complete success.

Insect Control

If the soil has been sufficiently enriched with well-fermented compost, insect damage will not be serious enough to warrant remedial measures. There should be few or no aphids. So far as our tests have gone, damage by the corn borer has been negligible. If for any reason corn borers threaten your fall sweet corn crop, use dust containing the ground stem of the tropical plant *Ryania speciosa*. Experiments have shown that this dust is more efficient than derris and equally as good as DDT without the undesirable qualities of the latter. It has also been found that corn with tillers has a much smaller number of larvae in the ears than the same variety from which the tillers have been removed. The tillers seem to "soak up" many larvae which otherwise would infest the ears of the main plant. This is another good reason for letting the tillers on the plant.

Corn at Its Best

Sweet corn grown in humus-rich soil will be packed full of vitamins and body-building minerals. These should be conserved, and not destroyed in preparing the corn for the table. The corn should be removed from the plant and eaten immediately in its raw state. It is surprising how sweet and how delicious such raw, fresh sweet corn really is. It is sweet corn at its best. Corn to be eaten raw should be harvested when it is in the full milk stage, and before it assumes the dough stage.

BIODYNAMIC PLANTS and SOLUTIONS

From material published by Dr. E. Pfeiffer in *Bio-Dynamics* for Summer, 1948.

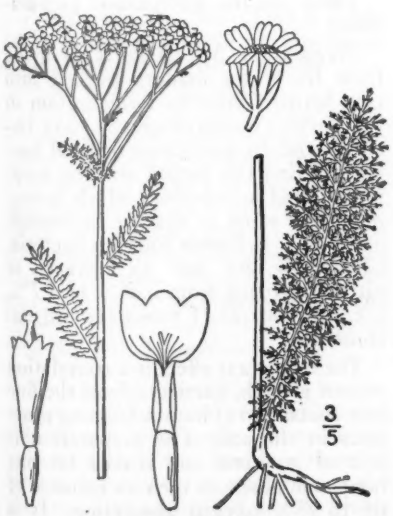
THE Biodynamic Method is a system of measures to be taken in farming and gardening with the final goal of improving the organic and humus state of the soil.

The conservation of organic matter is one of its main concerns. Where there is no organic matter available there is no possibility of introducing biodynamic practices.

Compost and manures are the main sources of organic matter which can be added to soils in order to improve them. Aside from these there are leaf mold, wastes, etc.

It is the first endeavor of the biodynamic farmer or gardener to collect as much available raw material for compost and to produce as much manure as possible. Biodynamic farming emphasizes the full economic utilization of increased livestock.

Manures and compost are not left to a chance fermentation, since losses may occur of valuable minerals, of organic matter or of nitrogen. The scientists and those who practice the biodynamic method have carefully studied the conditions under which manure and compost rot,—ferment,—in such a way that there is obtained as the final product, humus, which is rich



Achillea Millefolium

Matricaria chamomilla

in nitrogen and preserves its total original content of organic matter and minerals.

A routine procedure for building compost and manure heaps has been worked out and described. ("The Compost Heap" and "Manure," reprinted from Biodynamics.)

Experiments have shown that the fermentation of manures and compost is effected by bacterial action. Losses of nitrogen are brought about by ammonifyers, denitrifyers, and heating (thermophile) bacteria. Undue oxidation may take place through too much access of air, or there may be washing out by exposure to rain. An acid peat or mucklike organic matter may result under anaerobic, too moist conditions.

The conditions are described under which *the proper fermentation takes place,* and procedures in farming and gardening are introduced in order to reproduce these favorable conditions. This is one of the major points stressed by the biodynamic method: how to bring about a proper fermentation of compost and manure without losses.

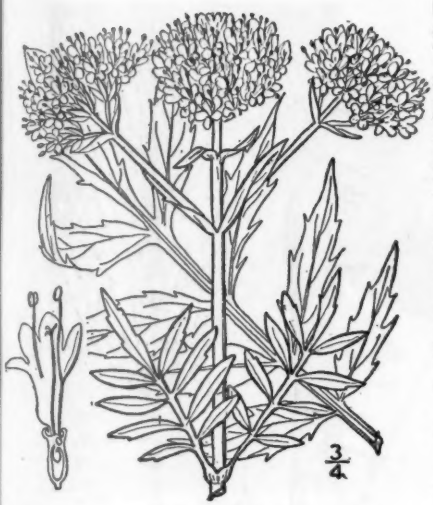
It has been observed that bacterial action as well as fermentation processes can be influenced by growth hormones, enzymes, traces of certain types of natural humus, extracts of certain plants, etc. (cf. Fermentation versus Decay, by E. Pfeiffer, Organic Gardening, September 1947). In order to influence the humus forming process and "digestion" of raw materials the biodynamic preparations have been introduced. These contain particular bacteria, typical f. i. of a fertile humus soil, which are also found in earthworm castings, and growth stimulating substances (auxins, growth hormones). The method of producing these preparations was described by the late Dr. Rudolf Steiner, an Austrian philosopher, who made an intimate study of nature's finer processes and forces. In later years he founded the Goetheanum in Dornach, Switzerland, a Free Academy for Spiritual Sciences. It was here that the writer and others started laboratory research in order to demonstrate the action and efficacy of the biodynamic preparations, a work which has recently been taken up in the United States at the Biochemical Research Laboratory, Threefold Farm, Spring Valley, N. Y., under the auspices of the Biodynamic Farming and Gardening Association, financed by friends and members of this Association.

Urtica dioica

These are the biodynamic preparations:

Preparation No. 500: It is made from fresh cow manure packed into cow horns; 6 months fermentation in the earth. Bacteriologically, one observes the disappearance of fecal bacteria during this period and the accumulation of a microflora which is very much the same as that of earthworm castings, i. e. humus forming bacteria. Chemically, we find an increase of nitrate nitrogen from 0.06% to 1.7%, i. e. of about 28.31 times the original content.

The important effect is a stimulation of root growth, particularly of the fine hair roots, and of humus forming processes in the soil. The preparation is diluted in water and stirred for one hour; one observes then an increase of up to 75% oxygen absorption. It is sprayed directly and immediately on



Valeriana officinalis

the land. This microflora which it contains is thus distributed evenly over the land. Since the microflora is similar to that of earthworm castings, preparation No. 500 acts as a kind of "substitute" earthworm. The bacteria count is 500 million aerobic bacteria per gram.

Preparation No. 501: This is made from rock crystal, finely powdered, treated for 6 months together with cow horns in the earth.

The research on the bacteriological processes is not quite concluded. The growth stimulating effect of this preparation upon stem and leaf and the assimilation process in plants has been observed. For example, it increases the assimilation in sunflower leaves up to 3.5 times (measured in weight increase). The bacteria count of the quartz powder, none; of the preparation No. 501, 50 million aerobic.

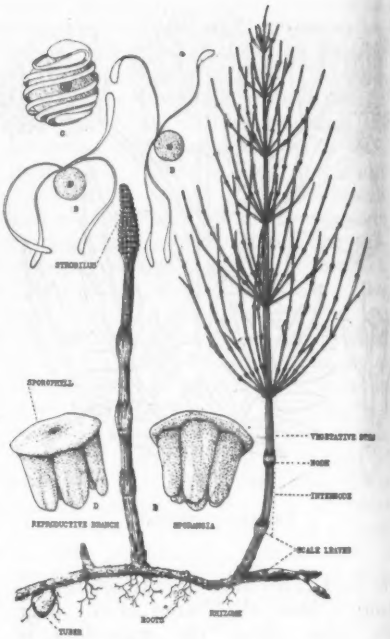
Preparation No. 502: This preparation is made from the yarrow blossoms (Achillea millefolium), fermented together with deer bladders over a period of 6 months in earth during the winter. The analysis of the available minerals shows a decrease of potassium from 1.05% to 0.13%, an increase of calcium from 0.05% to 0.375%, i. e. of 75 times; a slight decrease of magnesium from 0.01% to 0.005%. Phosphate remains stable at about 0.06%. The major increase is again observed in nitrate nitrogen from 0.07% to 2.5% or 35.8 times the original. Nitrogen fixing bacteria have migrated into the preparation and lived and worked there. According to Dr. Rudolf Steiner, the originator of these preparations, No. 502 has a stimulating effect on the use of sulphur and potassium by plants in their growth. This in turn effects the building up of protein and carbohydrates and their balance. This preparation, as well as the others, acts as a biocatalyst.

Preparation No. 503: This preparation is made from *Matricaria chamomilla,* chamomile blossoms, fermented together with the small intestines of healthy animals (cows), again fermented over the winter bedded in earth. It is clear that only good humus earth can be used, for its richness in soil building bacteria which migrate and accumulate in the preparations. No "dead" earth should be used. The role of the animal organs will be demonstrated on a later occasion. Their content of hormones and growth substances is most important, therefore only healthy animals should be used. When we say healthy, we mean not only animals which appear to be healthy but those which are free from malnutrition, deficiency diseases, infections, and which are not onesidedly forced to too high production. Their feed too should be derived from fertile, healthy soils. The chemical test for available minerals has revealed that in this preparation a considerable increase in calcium, nitrate nitrogen and phosphate took place during the fermentation: calcium from 0.05% to 0.41%, almost 10 times; nitrate nitrogen from 0.04% to 3.1%, 77.5 times; phosphate from 0.08% to 0.75%, about 9.4 times. Potassium has declined two-thirds, magnesium 2.5 times. Ammonium nitrogen is very low, 0.002%, and remains constant.

The preparation No. 503 is of special interest because it is made from chamomile. This plant contains a growth hormone which is a particular stimulant for the growth of yeast. The remarkable thing about this growth hormone is that it works in very high dilutions. Boas (University of Munich) reported, before the war, that chamomile juice is active at its best in a dilution of 1:8 million. Since then, it has been reported that even in dilutions of 1:1 billion these hormones are still effective. That high dilutions could affect plant growth seemed unbelievable 25 years ago when the biodynamic preparations were first tried. The study of growth substances and trace elements has revealed, in the meantime, that dilutions of 1:1 million up to 1:1 billion are nothing extraordinary. In fact, many of these biocatalysts do their jobs best just in these high dilutions while in a more concentrated form they may be ineffective or even harmful. This is the case with trace elements such as boron, cobalt, molybdenum, and many others.

Preparation No. 504: This preparation is made from stinging neetle (Urtica dioica) leaves and stems, buried about 2 feet in humus earth, separated from the soil by a thin layer of peat moss. They undergo a fermentation during one year which produces a fine brown-black humus and breaks down the fibrous parts of the plant. The plants are used shortly before the blossoming stage, no mature plants should be used. The most interesting change during the preparation is that the stinging nettle humus is enriched about 100 times in molybdenum and vanadium which are the trace elements necessary for the activity of nitrogen fixing bacteria.

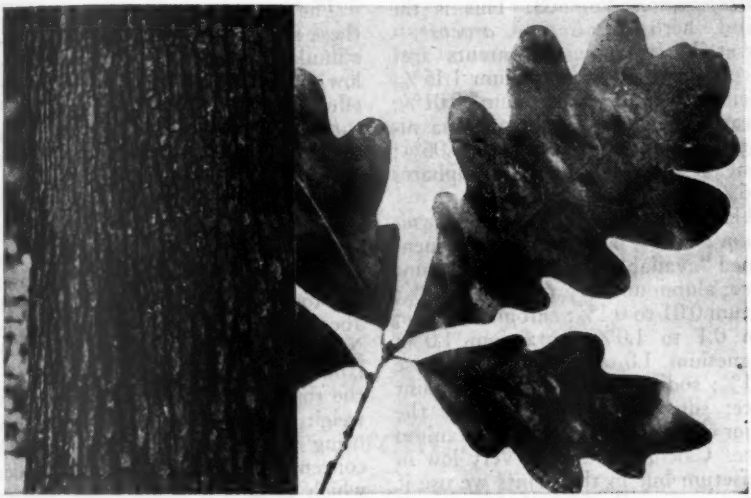
Preparation No. 505: This preparation is made from oak bark (*Quercus robur* or *Quercus alba*) from not too old a tree, buried together with the skulls of ruminants. The resulting humus is dark blackish brown and of a particularly fine structure. The peculiarity of the oak tree is that it accumulates a tremendous amount of



Equisetum arvense

calcium in its bark during growth even when it grows in a soil very poor in calcium. In fact, the highest calcium ash content was found in oak trees growing on a sandy, calcium deficient soil. The calcium content of this preparation is, therefore, very high, more than 10%, as determined spectrographically. Of these 10% about 0.1% is readily available. Potassium decreases slightly from 0.05 to 0.013%; phosphate increases from 0.01 to 0.03% of the available fraction, while the spectrograph shows an increase of from 10 to 100 times.

Preparation No. 506: This preparation is made from dandelion (*Taraxacum officinalis*) combined with the mesentery of ruminants, rich in glandular cells. There is a decrease of potassium from 1.25 to 0.27%. The increases through the fermentation process are quite remarkable. Of the available fractions we have an increase of calcium from a trace to



Quercus alba

0.08% while the total calcium is around 10%; an increase in available magnesium from 0.007 to 0.01%, the total being 10%; increase of nitrate nitrogen from 0.336 to 3.38% through bacteria action; increase of phosphate from 0.46 to 0.72%. Sulphates show up with 0.005%. The spectrographic analysis runs as follows: increase of alum from 0.1 to 1%; iron from 0.1 to 1%; molybdenum from zero to 0.0001%; nickel from zero to 0.0001%; titanium from 0.1 to 1%; vanadium from zero to 0.0001%; zinc from zero to faint trace. The following remain unchanged: boron 0.1%; barium 0.1%; copper 0.01%; manganese 0.01%; sodium 1%; lead 0.001%; silica 1%. There were slight decreases in chromium, 0.001% to faint trace, in silver from faint trace to zero. In general, it can be stated that the decreases in all of the above preparations are due to washing out, while the increases are the result of migration and absorption from outside and of bacterial action.

The bacteria count of the dandelion was 70 Million aerobic, no anaerobic; of No. 506, 360 Million aerobic plus a spreading species, and 180 Million anaerobic bacteria per gram.

Preparation No. 507: This preparation is made from the juice of the blossoms of *Valeriana officinalis*. It has been used in greenhouses for stimulating assimilation and increasing the colors of flowers, thus compensating for the reduced amount of light which passes through the glass. This preparation is used in high dilution (5-10 drops to 2 gallons of water) as a spray over the base and cover of manure and compost heaps. Previous experiments (Biodynamic Farming & Gardening, Chapter XI, by E. Pfeiffer) have shown that it attracts earthworms and stimulates their propagation. It is the cold-pressed juice of Valeriana officinalis blossoms. The spectrographic analysis reveals the following contents (at the magnitude given in %): aluminum 0.001; boron 0.001; barium 0.001; calcium 1.0 to 10; copper 0.001; iron 0.001; potassium 0.01; magnesium 0.1 to 1.0; manganese 0.01; sodium 0.001; phosphorus 0.1; silicon 0.001. The bacteria count was 1 million aerobic, anaerobic none.

Preparation No. 508: This is the dried herb *Equisetum arvense,*— horsetail. Its mineral contents are: silicon above 10%; potassium 1.15%; calcium 0.42%; magnesium 0.01%; nitrate nitrogen 0.47%; ammonia nitrogen a trace; phosphate 0.06%; manganese a small amount; sulphates 0.36%.

The spectrographic analysis of *Equisetum arvense,* besides the above mentioned "availables," shows: silver faint trace; aluminum 0.1%; boron 0.001%; barium 0.01 to 0.1%; chromium trace; iron 0.1 to 1.0%; potassium 1.0%; magnesium 1.0 to 10%; manganese 0.01%; sodium 0.1 to 1%; lead faint trace; silicon above 10% (it is the major element in this plant); titanium trace. Calcium is usually very low in equisetum but in the plants we use it was exceptionally high, being second to the silicon content.

The bacteria count was 21000 aerobic bacteria per gram, no anaerobic bacteria.

The place where all these plants are grown, again has an influence upon their contents. One should be sure to use only those growing on the very best, rich, if possible, biodynamically enlivened soils.

Taraxacum officinalis

The average concentration of all of these preparations used as a starter or stimulant is 0.005%. This may seem low, but if one considers the hormone effects as described in current literature, being effective in concentrations of 1:100 Million and more, then these are still "concentrated."

In practice the preparations are used, 2 grams each of 502-507 to 15 tons of compost or manure, in a concentration of 1:7.5 million, certainly not too high a dilution in view of the above described results. No. 500 and No. 501 are sprayed directly on the land and on the plants, resp. Figuring the top layer of the soil of an acre to weigh about 2 million pounds, and using 40 grams of 500 per acre, the concentration would be 4:100 million, which is almost exactly the concentration of the optimum yeast fermentation test. In the field of growth hormones, such dilutions or concentrations are not at all unusual. Of course, if we think in terms of fertilizer as was the custom at the time of the invention of these preparations 25 years ago one would marvel at such high dilutions and say, as was said then: How can such a speck of material have any effect at all? The subsequent progress of science itself has taught us better.

Now why do we emphasize the trace element contents of these preparations? First of all, one must remember that the process of fermentation increases the content of some of them, such as molybdenum, manganese, titanium, and vanadium. Recent research has shown that traces of these elements in a concentration of 1 part per million are essential to the proper growth and nutritive value of plants and bacteria. Molybdenum and vanadium are necessary for the action of nitrogen fixing bacteria like *Azotobacter chroococcum.* Without these traces the bacteria would not do their job, which is absorption and fixation of atmospheric nitrogen and its transformation into nitrate nitrogen. That they do work in the presence of these trace elements we can see in the re-

markable increases of nitrate nitrogen in No. 500, 28.3 times; No. 502, 35.8 times; No. 503, 77.5 times; No. 506, 10 times. Manganese has an influence upon the reduction-oxidation process in plant leaves. The roles of other trace elements still need more study. A study of the bacterial changes in and through the preparations is still in progress. This may be stated, however, as a preliminary: through the treatment, fecal bacteria in manure and those which break nitrogen down to ammonia or nitrates with subsequent losses in nitrogen, disappear and give way to nitrogen fixing bacteria. (cf. Trace Elements, by E. Pfeiffer, Organic Gardening, December 1947, January 1948. Published at Emmaus, Penna.)

Minerals From the Sea

By J. H. DAUGHTRY, D.C.

FOR several years I have been greatly interested in the organic method of agriculture, and have puzzled over one problem—How to restore the necessary minerals to the soil. Of course the standard advice has been to use compost, but I felt that if the compost was made from vegetation that was grown on minerally deficient soil, and manure from animals fed on such vegetation, then the compost had of necessity to be also deficient in these minerals.

Knowing that the sea was a vast storehouse of such minerals, and that these minerals had in great measure been leached from the soil, I felt that we should be able to take them from the sea and restore them to the soil, but as everyone considered that salt was detrimental to plant growth, was afraid to use it for fear of killing the vegetation. Then it dawned on me that the salt in the ocean also came in part from the land, and that as animals needed salt in the diet, perhaps a small percentage of salt might improve instead of hinder the growth of plants.

I purchased fifty pots, filled half with a mixture of soil, compost, and mixed in a breeder box of earthworms. The other half was filled with the soil and compost mixture, but I allowed the worms to escape from another breeder box and used the contents of the box in the mix.

Cabbage seed was planted in the center of each pot, and radish seed on the side in half the pots, after the pots were treated with varying amounts

of sea water. Holding four pots without sea water, and adding measured amounts to the rest in groups of four, the pots were numbered according to the amount of sea water contained. 0-1-2-3-4-5-6-8-10-12-14-16.

The seeds planted in pots No. 14-16- were about a week later in coming up, but at the end of seven weeks had caught up in size with those in the pots that contained no sea water, and after ten weeks were the largest in the group. They are all the healthiest looking plants that I have ever seen, and everyone that sees them comments on their rich dark green color. No poison has been used of course, and they are almost free from any insect damage, only four or five of the plants have holes in the leaves where something took a bite.

I have been very careful not to use too much water as I wanted to avoid any chance of leaching. If anything I have used too little instead of enough, but even in the hottest weather, when I was unable to water them on time they showed less wilting than other plants in the garden.

We ate a few of the radishes at the end of the fifth week, found them plump, crisp, tender, and having a flavor, or perhaps I should say savor that did not call for dipping in salt as usual; but the best part was that they didn't 'Talk back'. Not a burp in a carload. First time in years that I could eat a radish without tasting it for hours. I have made arrangements to have a spectroscopic analysis of the mineral content at the proper time, but will have to pass up a complete Vitamin test as the nearest Lab. that does that work wants two hundred dollars per plant, and that is too much to spend on amusement. Anyway they would probably lose a lot of the vitamin content in shipping so far. (Sour Grapes)

While I am certain that the mineral and vitamin content are higher than in plants grown the usual way, I feel that it will take several years to grow plants, compost them, and return them to the soil for further growth and composting before I get those minerals in the Organic form in amounts necessary for optimum human nutrition. I have been cramped for space here, but own a large tract of land in the Ozark mountains that I intend to develop into a health and summer resort in the near future, and will have land enough to go into this on a large scale.

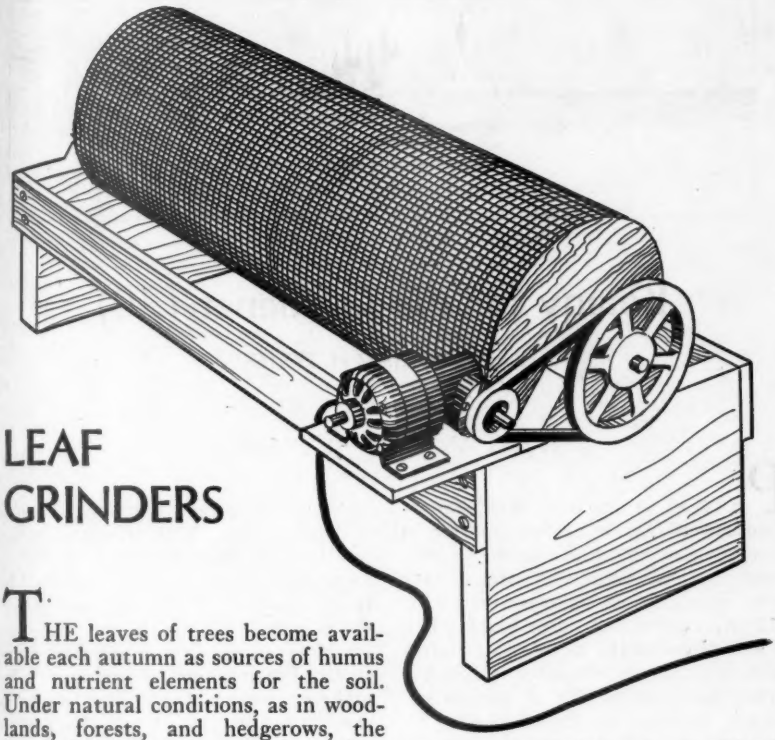
While I am sure that most if not all of the readers of the *Organic Gardening* Magazine are sold on the use of compost vs. chemicals, I feel that only a small percentage really knows the WHY of the matter, so to make clear the reasons behind this experiment I will go into a bit of body chemistry.

The human body is composed of about eighteen elements, fifteen of them in measurable quantities and the others in trace amounts. Some of them such as oxygen and hydrogen may be utilized in their inorganic form, but others such as iron, iodine, etc. must be changed from the inorganic to the organic form by the plants we eat before they can be used to build flesh, blood and bone. Only plants have the power or ability to make this change, the animal body does not. To put it plainer, the iron in a nail is different from the iron in a leaf of spinach. The iodine that is sold in the drugstore is different from the iodine in seaweed or from fish that have obtained their supply from sea vegetation. The health of plants depends upon the percentage of these organic minerals available in the soil, and our health depends upon the supply in the plants and thus goes back to the supply in the soil.

Seawater is said to contain all these essential elements in the same proportions as found in our blood, so if applied in proper quantities to the soil, should result in being taken up by the plants, changed in form and made available to us in our food.

This helps explain why land that has been composted with seaweed produces plants that are capable of reseeding themselves on the same land for hundreds of years, and why seeds

(*Please turn to page* 51)



LEAF GRINDERS

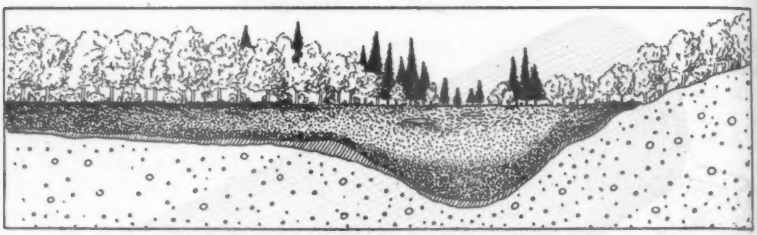
THE leaves of trees become available each autumn as sources of humus and nutrient elements for the soil. Under natural conditions, as in woodlands, forests, and hedgerows, the leaves form a mulch over the surface of the ground and gradually are converted into humus by the soil organisms. Under the artificial conditions of our towns and cities, the leaves of trees are burned, hauled to city dumps, or otherwise removed from the land where they might return to the soil the organic matter and valuable minerals they contain.

When placed in piles or heaps, leaves tend to pack closely and absorb and hold so much moisture that they do not decompose very readily. The rate of decomposition of leaves can be greatly accelerated by grinding them into small particles so that they present much greater surfaces to the organisms of decay in the compost heap or in the soil.

Many kinds of devices may be used for grinding leaves. These will be described and illustrated in forthcoming issues of the *Organic Gardening* magazine. Our readers will doubtless suggest, design, build and use still other types with which leaves can be reduced to small particles.

The grinder described and illustrated in this article was designed and built by J. I. Rodale, Editor of *Organic Gardening*. It consists of a cylinder having wooden ends and wire screen sides. The wire screening used is of ⅛ inch mesh. In the cylinder are placed small angular stones which grind the leaves against the wire screen as the cylinder is rotated slowly with a suitable motor. The leaves are put into the cylinder through a semicircular, hinged trap door on the end of the cylinder opposite the pulley which drives the cylinder. Extending through the cylinder is a steel shaft with inexpensive bearings on the end blocks which support the cylinder. The motor is geared to turn the cylinder about 36 times per minute. As the leaves are reduced to the size of the

(*Please turn to page* 50)



Botany for the Gardener (20)

By DR. WILLIAM H. EYSTER

PEAT AND THE PEAT BOG

PEAT is, as we have seen, an accumulation of raw organic matter in places where conditions for the decomposition of the organic matter cannot take place. It is yellowish-brown or brown in color, but turns black when it is exposed to the air. A water basin in which peat accumulates is called a peat bog. Peat usually is acid in reaction and can absorb from 3 to 15 times its weight of water. It is made up of from 60 to 98 per cent organic matter, is usually high in nitrogen but low in phosphoric acid and potash. Fresh peat contains from 80 to 95 per cent water, but this content is reduced to between 30 and 70 per cent before marketing the peat.

Not all places where water accumulates are bogs. One must distinguish between bogs and such watery places as marshes, swamps, sloughs, mires, and quagmires. A bog may be recognized by its plant life. As a matter of fact, a peat bog is a small world all by itself. As a rule a peat bog is undrained and receives the drainage of a small watershed, the amount of water received being just about enough to make up for what is lost by evaporation. When the plants or plant parts of this little world die, their dead bodies and residues fall into the water and accumulate in the bottom. Decomposition of the plant residues is prevented by the organic acids in the water. Only such plants continue to live in a peat bog as can survive the high acid concentrations. Plants which at first grow around the shore line of the bog may become so crowded that they push out in a floating mat on the

PITCHER PLANT

SUN DEW

LABRADOR TEA

BOG ROSEMARY

surface of the water. These plants may, in time, occupy the entire surface of the water in the bog, while leaving free water underneath. Such a mass of plant material will yield to shifting weights so that it "quakes" as one walks over it. Such a bog is sometimes called a "quaking bog."

Plant Inhabitants of the Peat Bog

The plant inhabitants of the bog are mosses, especially sphagnum, and members of the heath family. The sphagnum moss has already been described. The most common heath plants are cranberry, bog rosemary, Labrador tea, leather leaf; such interesting insectivorous (insect-eating) plants as the sundew and pitcher plant; and some orchids, as dragon's mouth and ladies' tresses. As a matter of fact, a peat bog can be identified by the presence of these plants, which may be identified from the drawings herewith.

Around the border of the bog will occur such heaths as Labrador tea and bog rosemary with occasional orchids and the insectivorous plants mentioned, while between the border and the center of the bog will usually be a low, level area occupied largely by sphagnum mosses. Mixed with the sphagnum near the center of the peat bog occur the long, trailing, fine vines of the wild cranberries. There may be also occasional orchids like the Arethusa (Dragon's head) and *Calopogon.*

Of unusual interest in the peat bog are the insect-eating plants. The pitcher plant is always interesting because of its pitcher-shaped leaves, usually containing a considerable amount of water. These "pitchers" are lined with stiff leaves which are oriented downward so that insects literally slide into the leaf as on a sliding board but find it difficult or quite impossible to crawl out against the hairs. The insects finally die and their

LEATHERLEAF

WILD CRANBERRY

DRAGON'S MOUTH

COTTON GRASS

SPHAGNUM

dead bodies are composted in the leaves and absorbed by the cells which line the base of the pitchers.

The sundew plants, on the other hand, have powderpuff-shaped leaves covered with glandular hairs which are longest around the periphery of the leaf blade. These glandular hairs secrete vitamin C and possibly represent the highest concentration of this vitamin known in plant tissue. Unsuspecting insects which alight on the leaves to eat of the glandular secretions are caught and held fast by the infolding of the long hairs around the edge of the leaf blade. Digestive juices are secreted and the soft parts of the insect's body are digested and absorbed by the leaf. It is believed that sundew, pitcher plant, and other bog plants thus use insects as a source of nitrogen which is deficient in peat bogs.

In time the peat bog may be completely overgrown by plants and may possibly be covered by silts and eroded materials from the surrounding slopes. Profiles of peat bogs are shown in Fig. 56.

Kinds of Peat

Various types of peat are recognized. Sphagnum plants which have undergone the least change are harvested and marketed as *sphagnum peat, highmoor peat, moss,* or *peatmoss.* It is yellowish brown in color, acid, and low in nitrogen and ash-forming elements. It is used for stable bedding and poultry litter, and eventually for soil building. *Sedge* and *reed peat,* also known as *muck, lowmoor peat,* and *humus* is usually dark brown to black in color, and is powdery when dry. It is less acid than sphagnum peat, and higher in nitrogen and ash-forming elements. It is, therefore, an important organic material for soil building. *Peat soil* is much like ordinary top soil which is rich in organic matter, and arises from the decomposition of peat. It is low in nitrogen and high in ash-forming elements. Its value as a soil builder depends upon its organic matter content.

Bacterizing Peat

Peat has tied up in it enormous stores of humic acids which can be liberated by suitable processes. A method suggested by Prof. Bottomley of England is, in abbreviated form, as follows:

(1) Arrange water-heated pipes in the form of a half dozen bays into which the peat is thrown after it has been moistened and thoroughly well impregnated with aerobic bacteria. These bacteria change the insoluble organic compounds in the peat into the soluble humates which are required as food for bacteria and later are avail-

(*Please turn to page* 50)

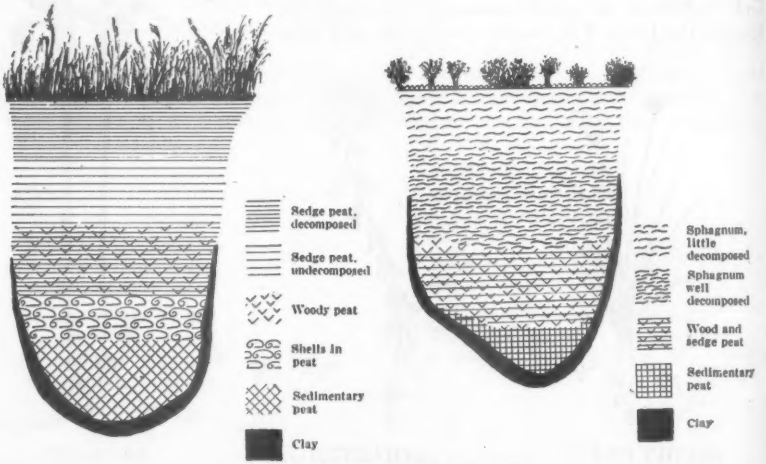
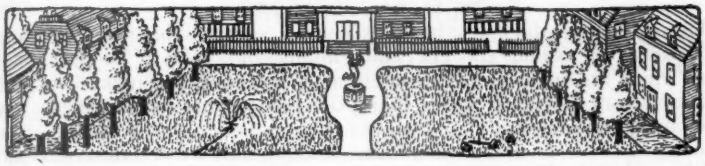


FIG. 56 Vertical Section of Peat Bogs



Garden Calendar — July

THE NORTH AND EAST

This is the time to evaluate your spring garden and make plans for the year ahead. Your activities in July will determine the effectiveness of your garden operations this fall and next spring. Also take time out in July to enjoy your garden. It is so easy to spend all one's time in planning, planting, and maintaining the garden that no time is left for the aesthetic and spiritual values.

Flower Garden. Continue pinching off the lateral shoots of the chrysanthemums and dahlias if you want fewer but bigger flower heads. Delphinium, bachelor's button, and phlox should be cut back near the ground to induce new growth for fall flowering. Also cut back violets, forget-me-nots, and nepeta to four inches. Hollyhock and veronica will bloom a second time if the old flowers are removed so that they do not develop their seeds. Keep the old flowers cut from baby rambler roses to keep them blooming all summer. Pinch back boltonia and hardy asters early in July to keep them bushy.

If your borders are lacking in color, interplant your border plants with coleus, pelargonium, and begonia. Annuals may still be planted in July such as lupines, balsam, portulaca, Shirley poppies, torenia, zinnia, godetia, Drummond's phlox, mignonette, and Virginia stocks. Make another planting of gladiolus for fall blooms. Columbines may be seeded in the coldframe. Do not be discouraged if the seedlings do not appear for a month or more, as the seeds germinate quite slowly. Also sow seeds of foxglove and Canterbury bells.

July mulching controls weeds and pays big dividends in better fall flowers. Peonies will profit from a liberal application of compost. Cosmos will appreciate a light sprinkling of wood ashes just as they are coming into flower.

The perennials should be staked before the plants break down under the weight of the flower masses. Order your bulbs now for fall planting. Old lily-of-the-valley beds should be renewed. Remove the old plants, enrich the soil with compost, and reset the bed with new pips which should be planted in small bunches.

Shrubs and Trees. Roses should be examined for sucker shoots which should be removed. The wisterias should be given a heavy pruning. See that your spring-planted shrubs and trees are well mulched. Water them if necessary.

Vegetable Garden. Plant vegetables for fall use—cabbage, endive, carrot, beet, Chinese cabbage, peas, potatoes, celery, lettuce, sweet corn, spinach, and others that will provide food for the table before winter.

THE WEST COAST

Flower Garden. This is seed sowing time for pansies and violets. Other seeds that may be sown now are calendula, centaurea, clarkia, cynoglossum, dimorphotheca, scarlet flax, godetia, larkspur, Iceland poppy, linaria, nemesia, schizanthus, snapdragon, winter stock, and winter sweet pea.

If your July garden lacks color, now is the time to plan the improvements for next year. Some suggestions are Leucophyllum with silvery foliage and soft

pink flowers, Nerine which also has pink flowers, and the blue-flowered Moraea.

Continue to disbud the chrysanthemums and dahlias for large heads. Lupines which are cut back immediately after flowering will make new growth and often bloom a second time. Plant the pansy beds with verbena, dwarf petunia, or annual phlox.

Shrubs and Trees. Rhododendrons, azaleas, and other ericaceous shrubs should be mulched with compost and leaves but never cultivated. Your annuals and perennials will also be benefited by a mulch which prevents weeds and conserves moisture.

Vegetable Garden. Plant vegetables for fall use including practically all salad, flavoring, and vegetable plants, and such root crops as beets, radishes, and carrots. Still time to plant sweet corn, peas, beans, and potatoes.

THE SOUTH

The South is made beautiful in July by oleanders, crepe myrtles, hydrangeas, rose of Sharons, and magnolias.

Flower Garden. Hardy phlox in white and all shades of red are remarkably heat resistant and should be in every garden. Shasta daisies lighten the heavy shades of salvia and torenia. Keep all dead flowers cut off your plants to prolong the blooming period. The hardy chrysanthemums should be pinched back consistently to produce low, bushy, free-flowering plants. Be sure to have buddleias and abelias in your garden. The poinsettias should be cut back to about two-thirds their present height to encourage branching. The clipped branches may be rooted and grown into new plants for potting and growth indoors. Plant daffodils, bearded iris, madonna lily, and gladiolus. Lotus and water lilies are worthwhile in the pond. Make repeated sowings of annuals.

Shrubs and Trees. Oleander and gardenia cuttings should be made. Reproduce by layering tea olive, camellia, and the broad-leaved evergreens.

THE SOUTHWEST *

Flower Garden. In the semi-arid Southwest July, August and September are hot dry months with temperatures soaring above the 90's and no rain. Only heat-loving annuals for immediate bloom should be sown where they are to grow and thinned when the seedlings are well established. Among the best such annuals are cosmos, annual gaillardia, marigolds, tithonia, and zinnias. From plant bands and cans plant out chrysanthemums, dwarf dahlias, marguerites, perennial sunflowers, perennial gaillardia, agathea, echium, pentstemon, and petunia. For shady locations, plant Japanese anemones, browallia, nicotiana and begonias. The semperflorens begonias can still be planted in either sun or shade. July is one of the best months to plant the winter-flowering annuals, such as tetra-snapdragons, stocks, calendulas, pansies, and violas for early September transplanting. Perennials advised for May and June may still be sown in protected seed beds watered by special sprinklers. Dig, divide, and transplant iris and spring bulbs. Let your South African and native bulbs dry out.

Trees and Shrubs. Trees and shrubs may be planted throughout July if care is taken to have water underneath and keep the basins well mulched. The same applies to roses and semi-tropical fruits. Potted plants and shrubs should be watered continually. Pots should not be filled too full and should have a top dressing of compost, leafmold or peat. Small pots set inside larger pots with a layer of sphagnum or peat will keep the more delicate plants in good condition. Camellias, azaleas, and other shade-loving shrubs should be watered on schedule. When camellias and azaleas are forming buds, hose them off frequently. Be sure that your young fruit trees have their trunks protected from sun-burn

* Charlotte M. Hoak, 1125 Stratford Ave., South Pasadena, Calif.

by tree whitewash. Your berry bushes may be pruned as soon as they have finished bearing. Leave from five to seven strong canes on each plant.

Vegetable Garden. Set out well grown plants of eggplant, tomatoes and peppers. Also plant summer squash, okra, string beans, pole beans, soybeans, cucumbers and such cool weather crops that can take the heat as chard, carrots, beets and kohlrabi. Tampala loves the summer heat. July is the month to sow the winter vegetables for September transplanting, our second "Spring" in the Southwest. Sow in seedbeds cabbage, cauliflower, broccoli, chard, onions and kale.

THE LOWER SOUTH **

Flower Garden. This month is practically vacation time for the flower gardener, as far as planting is concerned. A few plantings can be made, such as gaillardia, globe-amaranth, ornamental sunflower, portulaca, verbena, vinca, and zinnia. He can now enjoy the results of former plantings that continue through the summer.

Trees and Shrubs. An excellent tree to plant in Florida is the papaya. It is remarkably quick growing. A young tree six inches in height planted in the spring will mature its fruit in the fall. For the benefit of those who are not familiar with this "melon that grows on a tree" it can be said that its fine fruit is one of the most wholesome and well flavored of all the Florida fruits. The flesh resembles in color and consistency a cantaloupe, but the black seeds are edible. The doctors say, "eat some of the seeds." This tree will grow on either muck land or sand, but prefers the muck. If planted in sandy soils it needs very liberal fertilizing. It responds quickly to compost, and will stand almost any amount of it. As the feeding roots are near the surface, there should be as little cultivation as possible. Six inches of mulch over the compost will prevent most of the weeds and grasses from starting.

Vegetable Garden. This month begins the season for planting celery seed, which should be sown on the surface, pressed down with a board, and protected from the sun. Some growers of home gardens cover the rows with burlap sacking and allow the seeds to sprout while thus protected. Tents of muslin are best for large plantings. Collard, eggplant, mustard, okra, pepper, rutabaga, New Zealand spinach, and turnip are suitable for planting at this time. Velvet beans for a cover crop, chicken corn and chufas for poultry can be raised to advantage this month.

** Edwin H. Abrams, St. Cloud, Florida.

LIFE SUBSCRIPTIONS

ORGANIC GARDENING MAGAZINE has decided to have a standing offer of life subscriptions at a price of $35.00. Regardless of your age, you will receive the magazine for the rest of your life. You will thus be relieved of the detail work of renewing from year to year.

For those who desire to make payment over a period of one year, send $5.00 and we will bill you for $5.00 every two months, until a total of $35.00 is paid.

ORGANIC GARDENING EMMAUS, PA.

WEAR AN ORGANIC GARDENING BUTTON

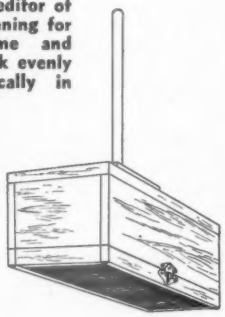
Attractive bronze button designed by J. I. RODALE, editor of Organic Gardening

Price $1.00, Postpaid

•

HANDY LIME SPREADER

A device designed by J. I. Rodale, editor of Organic Gardening for spreading lime and phosphate rock evenly and scientifically in the compost heap. Prevents caking in one spot, flying in the air on windy days, and dirtying clothes.



$4.50 Postpaid. West of Mississippi $5.00.

ORGANIC PRODUCTS CO.

Dept. A 264 Canal St.

NEW YORK 13, N. Y.

Don't Fear Poison Ivy

rashes, rough dry skin

Soiled or stained hands

BE SAFE • BE SURE

Before gardening or doing dirty work rub HANTON — a marvelous LANOLIN lotion into your skin.

An invisible film is formed which will protect your skin from stains and grime, by simply washing with soap and water after completing dirty work. Leaves your skin soft and clean.

COMPARE HANTON

with ANY other lotion. If it does not do all we claim, your money will be refunded.

Large size over a month's supply only $1.00. Buy it today from your garden supply house or

Dept. O. HANTON CO., Fort Lee 28. N. J.

LEAF GRINDERS

(*Continued from page* 43)

mesh in the screen, the particles fall through the screen and accumulate underneath. With this type of grinder, the leaves must be somewhat dry—enough to be fairly brittle, otherwise they will have to stay in the cylinder longer. The cylinder and motor are mounted on an inexpensive wooden base, as shown in the illustration.

This grinder can be used also for screening compost, soil, gravel, or other materials made up of solid particles of different sizes. It could also be turned with a crank by hand, or with a handle fastened to the periphery of the drive wheel.

—o—

BOTANY FOR THE GARDENER

(*Continued from page* 46)

able for crop plants grown in the soil to which this material has been added. The peat must be left in these heated bays at a temperature of about 79 degrees F. for ten days. During this time the peat will settle down somewhat. It darkens in color, but otherwise there will be no outward signs of any changes taking place. The peat at the end of the 10-day period will be rich in plant foods.

(2) The peat now rich in soluble humates is sterilized with live steam for an hour or until it is completely sterilized. Steam at about 80 pounds pressure is sufficient.

(3) The peat, now sterile and rich in plant foods, is removed to a shed where it is inoculated with nitrogen-fixing bacteria. These will require only a short time to develop in the fertile heap of sterile peat, and this is then spread on the floor in heaps and air-dried. As soon as it is dried, it is packaged in bags and is ready for distribution and use.

The enormous and almost inexhaustible peat bogs in this country represent a sufficient source of organic matter to restore to our crop plants the humus which has been and still is being mined out of them by modern agricultural practices.

GROUND MOLES AND THEIR CONTROL

(*Continued from page* 31)

the ground directly above the mole's runway so that the wires encircle the runway. The ridge directly under the trip pan is forced down. This blocks the runway. When the mole comes along, the upward pressure of his body on the pan trips the spring mechanism resting on the surface. This mechanism pulls up the choker wires which catch and kill the mole. The trap is harmless to children and pets, and does not damage the skin of the mole —an important item when they are being trapped for their fur.

FIGURE 1

KILL MOLES
With NASH Traps

Save Your Soil

Kill the moles that feed on earthworms—eliminate use of poisons—with Nash Choker Loop Traps. Safe—sure—can't harm pets or children. $2.50 at your dealers, or postpaid.

FREE

New pamphlet "How to Kill Moles" tells you all about mole habits, how to locate main runways, illustrates trapping method. Sent free to Organic Gardeners. A postcard or letter will bring your copy.

NASH MOLE TRAPS 258 E. South St., Kalamazoo, Mich.

MINERALS FROM THE SEA

(*Continued from page* 42)

'run out' in a few years when grown under 'chemical' fertilizing.

It is true that plants and animals will take up the inorganic minerals in the absence of the organic form, but they are used as 'fillers' and produce weakness, hardening of the tissues, (and in the case of humans—hardening of the arteries and organs) and lead to disease and death.

What I have done so far is just a start. I am saving part of these plants for seed, and believe that they will be healthier, and will adapt themselves to the ability to stand greater quantities of salt so that greater quantities of the other minerals may be made available. Also that they will have a natural savor that will make the use of table salt unnecessary as a seasoning. This alone should benefit the health of the consumers as salt is another of the inorganic minerals that we use to excess.

DRIED SEAWEED

FROM THE COAST OF MAINE

Give Your Soil the Benefit of Minerals from the Sea

WRITE FOR PRICES TO

T. C. HUGHES

EDGEWATER PARK, N. J.

FOR BETTER LAWNS
LOVELIER GARDENS
USE HYPER-HUMUS

Hyper-Humus

The CULTIVATED Organic

It vitalizes your soil and encourages healthy growth.

No Shipments West of Miss. River

Ask your Dealer. Write for Folder 19

HYPER-HUMUS CO., NEWTON, N. J.

Hints for the Vegetable Garden

For each hint on the vegetable garden accepted for this page, the contributor will be paid $3.00. The hints may be concerned with any aspect of the successful culture of any important vegetable.

LUSH VEGETABLES IN CLAY

In grading my home grounds down to the street level it was necessary to remove all the topsoil. The subsoil is a heavy clay which is greasy when wet and hard as a brick when dry. There was no purpose in digging this garden. Instead row trenches 12 inches wide and 8 inches deep were opened and filled with well-fermented compost which has the smell of rich leafmould. The row trenches filled with compost were then covered with about an inch of the clay mixed with an equal part of the compost. This mixing had to be done when the clay was just dry enough to handle. The vegetables were then planted in the rows thus prepared. The growth of peas, spinach, onions, lettuce, radishes, tomatoes, asparagus, strawberries, peppers, and celery has been, without exception, rapid and lush. Without the composted trenches, the vegetable garden would have been absolutely impossible.

~+~

CABBAGE MAGGOTS

Cabbage maggots are the larvae of a fly (*Hylemia brassicae*) which bore into the roots of the cabbage, radish, and other plants belonging to the mustard family. The adult of the maggot is a small fly not unlike a half-sized, long-legged housefly. The adults lay their eggs at about the level of the soil on the bases of the plants. Larvae hatching from these enter the roots and retard the growth or even kill the plants. In the seed bed the young cabbage plants may be protected by screening to keep out the parent flies, or by the use of tobacco dust. By transplanting the young plants to the field immediately after the egg-laying period of the first brood of flies, they will have established themselves and made sufficient growth by the time eggs are laid for the second brood that they will suffer little damage. Egg-laying about the roots of plants transplanted in the field may also be prevented by placing a cardboard disk about each plant. This disk should be cut in such a way that the stem of the plant is in the center of the disk.

W. H. E.

~+~

BRACKEN AND WOOD ASH FOR POTATOES

For the past eight years we have used bracken and wood ash on the potato ground with great success; the former being dug in the Autumn and the ash sprinkled when planting out. Even Golden Wonders crop well with this treatment while flavor and quality are beyond reproach.

In almost fifty years experience of potato growing, without artificials, we have had no disease, therefore, no poison spraying. We are convinced that humus, whether as rotted manure, muck, or compost is the secret of healthy potatoes of the best quality.

Mrs. R. Weir,
Melrose Road, Galashiels,
Selkerkshore, Scotland.

~+~

GROW TOMATOES WITHOUT TRANSPLANTING

We have found that planting tomato seeds in the garden in a row where they are to stay, is the best way to grow late tomatoes. Plant several seeds in each hill and cover with compost, then pull out all but one strong plant in each hill. These plants are stronger and more hardy than plants grown any other way and withstand more cold weather in the late fall.

Nancy E. Benton,
R. R. 2, Corydon, Indiana.

NUTRITION AND THE SOIL by Dr. Lionel James Picton, O.B.E., with an Introduction by Dr. Jonathan Forman, F.A.C.A. (The Devin-Adair Company, Publishers, 1949. $4.00). Available through Organic Gardening.

Dr. Picton has written one of the most valuable and significant books of our time. It is concerned with *nutrition* and the *soil* and has a vital message for everybody. Everybody eats. Everybody should know what he eats. The bodies of animals and man are bits of the soil into which has been blown the breath of life. Without the soil, land animals cannot survive on this earth. Our fertile croplands are being carried away and displaced by erosive forces at an alarming rate. As a result of both artificial cultural practices and artificial chemical fertilizers, many of the chemical elements in the soil necessary for the building of normal, healthy bodies are being leached out and carried away, while some of the essential elements are being precipitated in the soil and thus inactivated. Complete bodies cannot be built from incomplete soils. In the U. S. A., the world's best-fed nation, chronic illnesses and deficiency diseases are on the increase; mental illness and nervous disorders have become a frightening problem; half of the population is far below par; one in eight will die of cancer.

Rheumatism, tuberculosis, infantile paralysis, anemia, rickets, influenza, heart disease, virus infections, ulcers, alcoholism, are rampant pillagers of the health and pocketbook of the people. Health insurance programs are being planned on a national "cradle to the grave scale," but so far, only a few pioneers seem to be concerned with the basic factor underlying health: *the food we eat.*

The daily newspapers and magazines of the United States devote much space to the abundance of foods, artificial fertilizers for increasing its abundance, poisonous sprays and dusts for protecting the overgrown but deficient food plants from insects and diseases, recipes for the preparation of foods for the table, radio chatter about enriched bread from which all minerals and vitamins and proteins have been extracted, but scarcely a word about the nutritional value of the food. Few people seem to realize that plants which are attacked by insects and disease-producing fungi are incomplete and deficient plants. They lack a proper nutritional bal-

Brownell Roses

Red Duchess
AND OTHER EVERBLOOMING
Sub Zero Hybrid Teas
25 Different Colors and Forms
Vigorous. — Beautiful. — Easy to grow. — Large abundant blooms, more constantly. — Comparable with the best. **Can live several decades even after low sub-zero.** ***Save replacement expense.*** **Plants that fail, anywhere, within 2 years, replaced free, purchased from the hybridizers —**
Also beautiful yellow and orange hardy Climbers
Send for pictured list
BROWNELL ROSES
52 Rose Park, Little Compton, R. I

PERFORMANCE COUNTS in SMALL TRACTORS
SEE THE POWERFUL 5-H.P GRAVELY— the world's finest, yet most moderately priced Garden Tractor. Complete line of exclusively designed power tools for every Garden, Lawn and Field job.
ONE TRACTOR DOES 17 JOBS!
GRAVELY TRACTOR
FIELD-TESTED FOR 27 YEARS
GRAVELY MOTOR PLOW & CULTIVATOR CO.
BOX 748 DUNBAR, W. VA.

ANNOUNCEMENT OF PRIZES.....

Responses to our prize contest on "Gardening With Leaves" have been magnificent, and so much valuable material has been contributed that the Editorial Staff has found it difficult to select the prize winners. After much consideration, the prizes have been awarded as follows:

First Prize to MR. RAY STOKE, 306 Poplar Street, Warren, Pa.

Second Prize to MR. DAVID H. LUCAS, Dutch Valley Road, Knoxville 18, Tennessee.

Third Prize to MR. GEORGE L. SILLMAN, 3210 Sutherland Ave., Indianapolis 5, Indiana.

MR. M. J. PLICE, Stillwater, Oklahoma.

MR. CLINTON B. TOOLEY, 7 Sound View Terrace, Greenwich, Connecticut.

MR. BOYD E. DELAMATER, 3616 Kendall Ave., Cincinnati 8, Ohio.

MR. A. REYNOLD MORSE, 21709 Kinsman Road, Cleveland 22, Ohio.

3 Generations of

FARMER USERS and THEIR FARMS TESTIFY TO THE VALUE OF

RUHM'S PHOSPHATE ROCK

Non-acidulated Plant Food

recommended by ORGANIC GARDENING. Increases yields, improves quality of all crops. Quick results, long lasting effectiveness at low cost. For full information write

SOILSERVICE, Townsend, Mass.
BRYAN & SHEFFER, Portland, Ind.
AUSTIN FEED & SEED CO., Chattanooga, Tenn.
VAUGHAN'S SEED STORE, 601 W. Jackson Blvd., Chicago, Illinois

ance of the nutrient elements, or some elements may be absent altogether.

This book is a study of nutrition from the soil up to the highest animals including man. It emphasizes the fact that the Earth is mother of all. It should be read by all health-conscious people and by persons who want healthy bodies. It should be read by expectant mothers, by nutritionists, by farmers, by everybody. The book is well written, printed with easy-to-read type on a good grade of paper, cloth bound, and contains 374 pages including an appendix giving some whole-meal recipes, and a good index.

FRUITS FOR THE HOME GARDEN by U. P. Hedrick. (Oxford University Press, 114 Fifth Avenue, New York 11, New York. 1944. $3.50)

Fruits for the Home Garden contains a wealth of information for the gardener who is faced for the first time with the problem of planting a fruit garden or small orchard. This book applies to all regions, as the exact soil and climate requirements are specified for each kind of fruit. Every step from planning the garden, selecting the varieties, planting the trees to the picking of the crop is given in detail. With this book you have the constant advice of an expert on fruits. Cloth bound, 171 pages, and well illustrated.

if you are interested in learning to write, *or* want books on vocabulary-building or word-finding, send for our catalogue.
RODALE PRESS, BOX O. G.
EMMAUS, PENNSYLVANIA

SAWDUST MULCH

Q. Is sawdust a satisfactory mulch for strawberry plants?
Mrs. A. E. W., Turbeville, Va.

A. Sawdust can be used for mulching strawberries without danger of injuring the soil. It serves to control weeds, conserve soil moisture, and regulate the temperature of the soil by preventing it from heating up during the day time. One must be careful, however, not to cover the crowns of the plants. The soil should first be composted and then the sawdust added carefully between the plants.

—o—

SCUPPERNONGS

Q. What is the best form of support for scuppernongs?
Miss M. R., Montgomery 1, Ala.

A. Scuppernong grapes can be trained on almost any kind of support. The upright trellis can be used satisfactorily. As a matter of fact, you can follow the same cultural practices and methods of pruning as for other kinds of grapes.

—o—

EARTHWORMS TURN THE COMPOST HEAP

Q. I would like to get away from turning the compost heap. How can this be done?
B. T., Ellsworth, Mich.

A. The compost heap need not be turned if a sufficient number of the domesticated earthworms are introduced just after the heat of fermenta-

MULTI-SHEAR LAWN EDGER

Patented
Not just another lawn edger, but a real shear!
Shears Lawn Edges Perfectly

The only lawn edger precision built of Crucible steel, special ground two way cutting blade, self sharpening, adjustable. Rubber tire mounted on die casted wheel, revolving on hardened steel bearing with coil tension spring. Catalogue on request.

Extra parts available.
Most efficient and moderately priced lawn edger.
Retail $3.00
By mail Postpaid $3.50
Obtainable thru all dealers from Mexico to Canada

APPLIANCE MANUFACTURING CO.
Dept. 3-X
P. O. Box 1822 SANTA ANA, CALIF.

ORGANIC IRON
Hemolasses Tablet

PROVIDES 10 MG. FOOD IRON PER DAY

Organic Gardening readers will be particularly interested in this natural product—useful in maintaining blood iron balance to prevent nutrition iron deficiencies often associated with that tired lack of energy feeling that so often troubles so many men and women. This remarkable iron product is different from the usual run of inorganic astringent often-constipating iron compounds. HEMOLASSES Tablets (the name of this *natural iron* product) is derived wholly from food sources. Hemoglobin for blood iron. Super "B" Yeast for natural B Complex and to prevent "B" deficiencies plus liver, bone marrow, chlorophyll, dehydrated molasses and folic acid. Nothing else ever offered exactly like it. It's good for you.

180 Tablets (month's supply) $4.50
½ size $2.50

Available at better dietary food stores or will ship postpaid direct.

BIO-FOOD DIVISION
80 MONTGOMERY ST. (Dept. 60) JERSEY CITY 2, N. J.

A Royer Compost Mixer (like the one shown here in operation on a Darien, Conn. estate) can save you an enormous amount of time in shredding manure and other composting materials . . . and assure you faster, more thorough fermentation in the compost pile. Worth many times its cost to farmers, gardeners and others handling large quantities of compost. Write for full information. Ask for Bulletin 46.

ROYER FOUNDRY & MACHINE CO.
181 PRINGLE ST., KINGSTON, PA.

FREE BOOKS . . . .

With a new type package containing 10 lbs. Culture with 1000 to 1250

EARTHWORMS

Postage prepaid $7.77

One copy each of "Our Friend the Earthworm" and "Compost: How to Make It" will be mailed you free. (Worth $1.35)

Our Gallon package — 800 to 1000 EARTHWORMS at $6.66, entitles you to one of the above books. (State choice)

Order from this ad or ask for our literature.

ORGANIC GARDENS

Perry Hall Fullerton, Md.

BLACK MOLASSES

This is a Barbadoes type molasses containing residual vitamins and minerals of cane juice remaining after crystallized sugar has been removed. Prepared by vacuum evaporation process. Sulphur free. Mild flavor.

17½ Ounce Can, Postpaid — $.75

Write for case lot price.

VITAMIN PRODUCTS COMPANY

Dept. M Milwaukee 3, Wisconsin

tion has subsided. We use this method in our farm pits which are 10 feet wide, 40 feet long, and 5 feet high. Within a few months these pits become a living mass of earthworms which literally digest the contents of the entire pit. If anything, the compost made with earthworms is superior to that which is made without them and hand turned.

—o—

SHADED COMPOST HEAPS

Q. Should the compost heaps be made in an exposed place, or in the shade of a tree or other object?

T. F., Clariana, Iowa.

A. The compost heap should be protected from the direct sunlight to prevent excessive losses of water. Without sufficient moisture content, the heap will not decompose properly.

—o—

STRAW MULCH

Q. I have bought 24 bales of straw with the intention of mulching my raspberries and all my garden after I get it planted this spring. Now I am told that the straw will take all the nitrogen from the soil. Will you kindly advise me on the use of straw mulch as indicated above?

A. B. T., Lewiston, N. Y.

A. Grain straws are highly lignified and if placed on the surface of the soil as a mulch will break down so slowly that they will not consume the nitrogen or other plant nutrients. Care should be taken not to work the straw into the soil. On the surface, it will prevent the growth of weeds, conserve soil moisture, and keep the soil cool and favorable for root growth.

—o—

SPENT MUSHROOM COMPOST

Q. Is the spent compost used by mushroom growers a good fertilizer for the soil?

Mrs. G. A., Springfield, Mass.

A. Spent mushroom compost has little or no plant nutrients left in it.

It contains some organic matter and may be used in heavy clay soil to improve its physical condition.

—o—

REPLANTING STRAWBERRY BEDS

Q. I have been told that it is necessary to plant a new strawberry bed every year or two. Is this true?
J. E. D., Washington, D. C.

A. Strawberry plants like so many other plants tend to "run out" when grown in soil that is badly out of balance as a result of using the highly soluble artificial chemical fertilizers. When grown in soil rich in humus to which is applied such natural soil supplements as phosphate rock, glauconite, and other similar materials, the strawberry patch should last for a number of years.

—o—

BROWN ROT OF STONE FRUITS

Q. What can I do to protect my stone fruits from brown rot?
W. K. S., Alexandria, Virginia.

A. Brown rot of stone fruits is caused by a parasitic fungus which spends the winter on dead fruits (mummies) and leaves on the trees or on the ground beneath the trees. Prevention in this case is worth a pound of cure. Remove all last year's fruits and leaves to the compost heap. Put a girdle of tanglefoot or other

ORGANIC ORCHARDISTS

It is requested that all orchardists who are operating their orchards organically register with Organic Gardening Magazine. We are interested in getting as many details as possible, as length of time the organic method has been used, size of orchard, kinds of fruits grown, health of trees, and quality of the fruits. Our Staff Photographer may be sent to your orchard to get photographs for feature stories or for other purposes.

COLCHICUM 6 for $2

The WONDER BULB

Simply place these Bulbs on bare table-top, piano, or window sill—then enjoy the astonishment of your friends.

GUARANTEED to flower without soil, water or care. Complete story in each carton. Excellent gift for flower lovers, children, shut-ins, and beginners.

6 TOP QUALITY BULBS for only $2 ppd. Imported from Holland—SUPPLY LIMITED, send $2 today.

Order enrolls you as Club Member, without obligation, in the famous

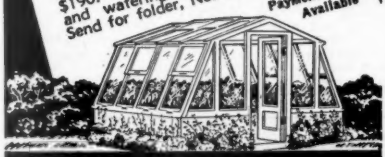
BULB of the MONTH CLUB

125 Madison, Dept. OGU, Chicago 3, Ill.

Orlyt GREENHOUSE $425

Comes in sections that go together with bolts and screws. Easy to put up anywhere, anytime. $425 buys the 10 by 11 ft. Orlyt pictured ready to go on your foundation. Other basic Orlyt models and Lean-tos from $190. Automatic heat, ventilation, and watering at reasonable prices. Send for folder, No. 27.

Convenient Payment Plan Available



LORD & BURNHAM

IRVINGTON 2, N. Y. • DES PLAINES 2, ILL.

Permanent Memorials

Remember the grave of your loved one, with a most gorgeous permanent remembrance. Wreaths 18-in. overall, $2.25 each. Sprays, 14x30-in., each $2.25; midget grave blankets, 20x40-in., each $4.35; grave blankets, 30x80-in., each $7.50. Hearts, 18-in. overall, each $3.25. Crosses, 18-in. overall, each $3.25. Stars, 18-in. overall, each $3.25. Pillows, 20-in. overall, each $4.00. The most beautiful and gorgeous products ever made, decorated and lacquered, will stand any kind of atmosphere. Prepaid to your door.

BRULE VALLEY NURSERIES & EVERGREEN CRAFTS, Brule, Wisconsin

"WORMS UNLIMITED"

TRADE MARK

JIM BATES SPORTS SHOP at Kewanee, Ill. recently purchased 5000 earthworms, from our wormery, because they realized the true value of buying only mature worms. . . . We do not sell, what is usually termed "culture," because the customer is likely to be very disappointed, with results from such shipments. "Cultures" often contain a predominance of week old, up to two month old, worms which require three months growth, before reaching the reproducing stage. . . . An order from us, for 1000, means you will receive 1000 mature or near mature worms. . . . With our plan, there is no wait, while your worms "grow up"—we give dollar for dollar value. . . . Write today, for information.

POLSON ENTERPRISES
1108 Leland Ave., Chicago 40, Ill.

WORMS THAT SQUIRM

. . . are the most active worms known. The bustling activity of these vigorous plowmen is just what you need to complete your organic program. Nature's compost makers give you the NPK formula which Nature intended for your soil.
Let WORMS THAT SQUIRM work for you—168 hours per week—in your soil, your compost heap, or your garbage disposal pit.

Write for literature and prices
BIOS EARTHWORM HATCHERY
1531 Broadway Boulder, Colorado

Hybrid Earthworms

EARTHWORM CULTURE (eggs, worms and castings) builds and conditions soil, no other fertilizer needed, no hand-turning of compost. They multiply rapidly. DO NOT MIGRATE. Better health for plants and man. Send $1.50 for 100, $15.00 for 1800. Additional savings on larger amounts. FREE information on request. Full instructions with each order.
SUNSET ACRES, GOLD HILL, OREGON

"SOILUTION"

The name describes the Hybrid Earthworm developed expressly for use in Gardens, Compost and Soil Improvement.

GET the BEST!
Descriptive Literature on Request.
Colorado Earthworm Hatchery
2134 Decatur St. Denver 11, Colorado

HERE WE ARE AGAIN, GARDENERS!
"CRAWFORD'S CRAWLERS"
(Domesticated Earthworms)
to help you
Rebuild Your Soil To High Productivity!
800 "CRAWFORD'S CRAWLERS" in Culture Box—$10.00
Other quantities and prices on request.
Write to
THE J. DELMAR CRAWFORDS
MARS, (20 miles North of Pittsburgh) PENNA.

sticky substance around the tree trunk to prevent crawling insects from carrying the disease-producing fungus from the ground to the tree. Shake the trees frequently to displace any curculios which puncture the young fruits and enable the fungus to penetrate the fruit and cause the brown rot.

—o—

POT PLANTS

Q. What is a satisfactory soil for growing pot plants?
Mrs. J. T., Houston, Texas.

A. For non-acid loving plants, the following soil mixture should be used when they are grown in pots: one part good garden loam, one part good compost, and one part sharp sand. When a plant becomes pot bound, it should be transplanted to a pot one size larger.

—o—

CUTWORMS BECOMING MORE COMMON

Q. Why are cutworms becoming more and more common and destructive in our garden?
C. A. Y., Houston 7, Texas.

A. The natural enemy of the cutworm is the toad. Toads also eat other insects. Poisoned insects eaten by toads kill the toads so that they no longer live in our gardens to keep the cutworms under control.

—o—

ASPARAGUS FROM SEEDS

Q. Would you consider it practicable to grow asparagus from seeds by sowing the seeds thinly, so as to

EARTHWORMS
Need *WEEDS and WASTE*
to make into plant food.
Build your garden by putting EARTHWORMS to work
1500 Earthworms (1½ gal. Culture) starts a small compost—$15.00. Free sample of Earthworm plant food with each $15.00 order.
Free counciling with Bernice Warner
OHIO EARTHWORM FARM
Dept. X-1 Worthington, Ohio

avoid the necessity of transplanting the crowns after two years' growth?

Mrs. F. C., South Hero, Vermont.

A. Asparagus may be grown from seeds as easily as almost any other perennial. The seeds may be sown in rows, as you suggest, and later thinned to the desired stand. The only difficulty with this method is that garden space will be tied up for two or three years while the seeds develop into plants old enough to produce stems for cutting.

—o—

WOOD CHIPS FOR MULCHING

Q. As a by-product of my lumber business I have wood chips which vary in size from one-half inch to pieces as large as your hand or a little larger. Are these wood chips suitable to place on the soil and plow under for such crops as corn, small grains, and eventually hay crops?

W. F. Y., Titusville, Pa.

A. Wood is made up largely of lignin which decomposes rather slowly. To insure more rapid decomposition, the chips should be put through a grinder which will reduce them to particles the size of sawdust or smaller. This material must not be used in excessive amounts in the soil as the organisms of decay will utilize all soil minerals in breaking down the wood, leaving little or none for the growing crops.

—o—

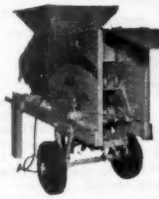
PANSIES AND VIOLETS

Q. Will pansies and violets thrive well among stumps in what was formerly a woodlot?

P. U., Bach, Michigan.

A. Pansies and violets grow naturally in the humus-rich soil of woodlands. They should find almost ideal conditions among the stumps in your former woodlot.

Greater Yield
Healthy, Sturdy Plants



Six Models to Choose From

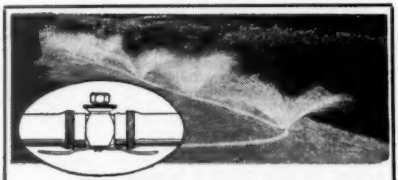
. . result when you use the richer, smoother moisture-retaining compost mixed by a KEMP POWER SOIL SHREDDER. These sturdy machines, with unbreakable spring steel cutting teeth, mix soils, manure and compost 90% faster and more thoroughly with little effort. Pay for themselves in one season! Write now! Select the machine that suits your needs from the KEMP Catalog.

Priced from $100.

50 Years' Experience Manufacturing Soil Shredding Machines

KEMP MANUFACTURING CO.

Dept. 4 1027 E. 20th St. Erie, Pa.



SPRINKLIT The Portable Sprinkling System

- 50 feet special Goodrich plastic hose with five solid brass sprayers—waters 1 to 1000 sq. ft.
- Sprayers can be turned on and off individually. With all turned off it doubles as a garden hose!
- It puts the water where you want it—and only where you want it.
- Waters the ground, not the air, with a fine, drizzle-like spray.
- Weighs only 8 pounds—guaranteed for five years.

GOODRICH KOROSEAL PLASTIC — $17.95
GOODRICH RIBBED PLASTIC — $14.95
(Plus Postage—50c East of Miss. $1.00 West of Miss.)
SORRY NO C.O.D.'S

See your nearest dealer or order from

HOWARD SALES CO.

1650C BELMONT AVE., NEW HYDE PARK, N. Y.
— Dealer and Distributor inquiries invited

ROMAC EARTHWORMS

Write for Folder and Prices

ROMAC EARTHWORM FARM

Box 375 Ashland, Ohio

THE ONLY KNOWN SCIENTIFIC METHOD OF MIXING ORGANIC MATTER WITH THE SOIL

Models to meet your needs . .

ARIENS TILLER

The exclusive features of Ariens Tiller — the original all-American, all-purpose tilling and cultivating combine backed by 16 years successful experience — put it in a class by itself for your purpose. Complete details upon request. Write

ARIENS COMPANY-BRILLION, WIS.

SAVE TIME-SAVE LABOR-SAVE MONEY

with a WIL-GRO GARDEN AID Compost Box

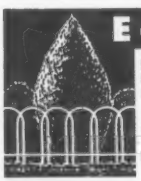
This scientifically designed unit more than pays for itself with every batch of compost 4 ft. square in size. It makes over a ton in a short time; enough to cover 400 square feet one inch deep. Think what this amount of humus or other fertilizer would cost!

The Wil-gro is not just a box, it's a compost box engineered to save you time, labor, space and money. Made of weather-resistant cypress. Ruggedly constructed, yet light enough to be easily handled.

Only $18.75 *complete plus shipping charges.*

Just the thing for the smaller garden. A compost box that measures only 38 inches square will make a good ½ ton of finely finished compost. Same rugged construction for only $15.75 complete plus shipping charges.

Willow Grove Earthworm Hatchery
257 Gilpin Road Willow Grove, Penna.



E-Z-GARDS

PROTECT YOUR EVERGREENS, SHRUBBERY, FLOWERS AND LAWN

Ornamental design adds to beauty of yard or garden.
Self-Supporting—No Stakes or Posts!
Easy to set up and just as easy to remove.
WRITE US FOR LITERATURE, PRICE AND NAME OF NEAREST DEALER.

BROADWAY MACHINE & MANUFACTURING CO.
SHELBYVILLE, INDIANA

Your Heating Problems are my business. Guaranteed results, including a surprising fuel saving idea. Send your problems and one dollar to Heating Expert, 177 Hill, Highland Park, Michigan.

SOIL SUPPLEMENTS

Q. What materials should be used to supplement the compost to make sure that all essential elements are in the soil?

A. R. M., Cleveland 22, Ohio.

A. To make sure that the compost and soil contain all the nutrient elements, minor as well as major, one should add such supplements as pulverized rock phosphate, ground limestone, shredded seaweed, and pulverized glauconite.

—o—

HOW TO GET EARTHWORMS IN THE SOIL

Q. Our soil is brick-colored and has lots of stones. How may we get earthworms to live in this soil?

Mrs. H. E. S., Colfax, California.

A. To have earthworms in the soil you must have enough organic matter in it to feed them. As a rule earthworms will appear in large numbers when a sufficient amount of raw organic matter has been put into the soil.

—o—

COMPOST FOR BLUEBERRIES

Q. Is compost to be used for blueberries, or what should one use that is not a chemical fertilizer?

O. S. L., Edmonds, Washington.

A. For blueberries it is best to use compost made from woody plant material and leaves. A compost made largely from oakleaves and sawdust would be excellent for blueberries. Do not use lime in this compost.

—o—

HOW TO PROTECT TREES FROM RABBITS

Q. Can you tell us how to prevent rabbits from injuring young apple trees?

Mrs. L. J., Chelsea, Vermont.

A. The simplest method of preventing rabbits from eating the bark of young and growing apple trees is

to enclose the lower part of the trunk with a cylinder of wire. By using a sufficiently fine mesh, the trees can also be protected from mice.

—o—

JAPANESE IRIS

Q. I have four plants of Japanese Iris which do not flourish in my soil which has been made acid with ammonium sulphate. Is this the wrong treatment, and if so, what can I use to provide suitable soil conditions?

H. C. G., Oak Park, Illinois.

A. Iris prefer an acid soil rich in humus such as occurs in woodlands. You can make a proper compost for them by using as raw materials, decaying wood, finely ground leaves, acid peat, and soil in the compost heap.

—o—

QUACKGRASS CONTROL

Q. What is the best method of eliminating quack grass in fields?

C. J. B., Skokie, Illinois.

A. Quack grass reproduces freely by underground stems which send up new plants at the nodes. It can be eliminated only by frequent cultivation and removal of as many of the rootstocks as possible. After a couple years of this treatment, plant the area with a fast-growing cover crop to crowd out the remaining quackgrass plants.

—o—

TEA LEAF MULCH

Q. I am informed that used tea leaves are good for mulching shrubs and roses. Is this true?

Mrs. R. E. G., Ridgewood, N. J.

A. Tea leaves make an excellent mulch for shrubs and roses. They should be applied without working them into the soil. The mulch should be thick enough to prevent the growth of weeds. It will also conserve soil moisture and keep the soil cool.

JOHN OTT *Presents*
a series of fascinating
FLOWER FILMS
Includes remarkable Time Lapse sequence of Dancing Flowers. Flower Pictures, especially suitable for clubs (7 films in sound and color) includes Time-Lapse Photography, Spring Blossoms, Plant Oddities, Flower Arrangements, How to Grow Iris, Gladiolus, Dahlia. Free Bulletin.
JOHN OTT
Film Library, Inc.
730 ELM STREET,
WINNETKA, ILL.

IRIS SPECIAL
Make your own collection:
Any 6 for $2.00; any 10 for $3.00
all 16 for $4.50
OAHU—Brown flushed violet
ORLOFF—Cinnamon brown on cream
PAILLAISSE—Dusty rose and cream
PRAIRIE SUNSET—Magnificent bright copper
RADIANT—Burnished golden bronze
RUTH POLLOCK—Yellow marked red-violet
SALAR—Cream overlaid with salmon
SANDIA—Deep bright pink blend
SHERIFFA—Metalic violet lightly veined
SIERRA BLUE—Very tall deep blue
SMOLDER—Deep blackish purple
STARDOM—Luscious coppery-pink
TREASURE ISLAND—Gigantic pure gold
WILL ROGERS—Unique velvety rose-red
WYNOOCHE—Huge blue and copper
YELLOW JEWEL—Deep waxen yellow
FREE Iris and Perennial catalog on request
LAMB NURSERIES
E. 101 Sharp Box O-7 Spokane, Wash.

THERMCAP
Saves Fuel All Ways
STOPS DOWN DRAFT AND CREOSOTE
your chimney top. That is all. Domestic size (for furnace, range or
$12.00 EACH DELIVERED
Just mortar this circular metal cap (with streamlined plus features) to both)
Satisfaction guaranteed by Manufacturer
THERMCAP CO.
ROCKLAND, MASS.

Plant Modern IRIS
No other flower gives such large returns for so little investment in time and money. Hardy, easy to grow in any type soil and now to be had in almost every color imaginable. Write today for our catalog describing many fine new varieties and special collections at attractive prices.
CHERRY HILL IRIS GARDEN
Pleasant Valley, Bucks Co., Penna.

Please mention ORGANIC GARDENING when answering ads.

TROPICAL PLANTS

FOR NORTHERN INDOOR GARDENS
FOR SOUTHERN OUTDOOR GARDENS

Special Introductory Offer $2.50 Postpaid: Bougainvillea Crimson Lake (Red), Hoya Variegated-Wax Plant, Croton, Dracaena Godseffiana & Pothos Aureus. Illustrated Catalog 25c, Free with orders of $2.00 or more.

SHAFFER NURSERIES
Rt. 2, Box 295-O — Clearwater, Florida

BULBS FROM HOLLAND

Our catalog with prices, offering hundreds of varieties of TULIPS, DAFFODILS, HYACINTHS, CROCUS, etc. All bulbs delivered duty and freight paid to destination.

J. HEEMSKERK
c/o P. van Deursen
Sassenheim, Holland

SOILFOODS

Request our new price list of over seventy Organic Materials and also request our Special Offers. Ruhm Phosphate Rock for Fall Application $2.50 per 100 lb. bag and $32.80 per ton f.o.b. Townsend—Activo for activating composts No. 25 Size (enough for 3 tons waste material) $6.99 including plans for making composter cabinet (prepaid within 300 miles of Townsend)

Organic Soilservice Headquarters
TOWNSEND, MASS.

BROKEN Jewelry WANTED

All kinds. Highest cash prices paid for rings, jewelry, spectacles, gold teeth, diamonds, broken and usable watches, etc. Cash mailed promptly. Write for FREE SHIPPING container.

LOWE'S
Holland Bldg., St. Louis, Mo.

Cleans Chimneys Permanently

Stops down draft — prevents furnace explosions. Satisfaction guaranteed. This copper pot (with character) Mailable. For free booklet address

WIG., ABINGTON, MASS.

SAVES FUEL

COLORFUL TULIPS

Write for our listing of Fall Bulbs.

ORGANIC GARDENS
Dept. O — Fullerton, Md.

Classified Ads

Rates are 2¢ a word. Minimum 25 words, or $5.25. Payable in advance. Include name and address in word count. (Deduct 15% from total rates, for Help or Positions Wanted ads.)

FLOWERS

DOWN THE DAFFODIL PATH; uses the new RHS Narcissus classification in the 1940 catalog listing 150 of the finest and newest varieties of Daffodils, at popular prices. **EMELENE M. COLE, Coos. Bay, Oregon.**

DELPHINIUM, Giant Pacific, Prizewinner at National and State Shows. Tuberous Begonias, Primroses. Plants and seed. Free catalogue. **OFFERMAN DELPHINIUM GARDENS, 4709 W. Stevens, Seattle, 6, Wash.**

IRIS—Tall Bearded, Fall blooming Dwarf, Intermediate, Spuria, Beardless Siberian, PERENNIAL ORIENTAL POPPIES, HEMEROCALLIS, PEONIES, DAFFODILS AND TULIPS. Catalog free. **IMPERIAL IRIS GARDENS, Cornell, Illinois.**

IRIS for the border, rockery and that shady spot. Send for catalogue listing all types of bearded, choice Japanese varieties, rare Reticulata and Juno species and lovely western natives. **WALTER MARX, Boring, Ore.**

IRIS—10 Beautiful Iris labeled including Wabash, $2.00, postpaid. Catalog Iris and Daylilies free. **SUNSET VIEW IRIS GARDENS, Constantine, Michigan.**

SEND FOR PRICE LIST, which includes over 100 of the best varieties of bearded iris and many varieties of modern daylilies (Hemerocallis). **M. T. YOUNG, 800 South Lincoln, Tallulah, Louisiana.**

BLOOMING SIZE LILY BULBS of Regal, Henryi, Davidi and Longiflorums Croft, Ace, Estate and K-D ten for a dollar. Large size six for a dollar. Minimum sale one dollar. **TERRACE FLOWER NURSERY, Arcata, Calif.**

ORCHID plants and seedlings, excellent hybrids previously sold wholesale now direct to you. Saving up to half. Send for lists. **LINDEROAKS, Broadmoor, San Anselmo, Calif.**

SPECIAL $1 OFFERS, postpaid: 10 mixed violets; 8 hardy perennials; 8 wildflowers; 8 ferns. All four offers $3.50. Catalog free. **ORCHID GARDENS, Grand Rapids, Minnesota.**

AFRICAN VIOLETS—We are specializing in rooted cuttings or young plants, 100,000 in propagation. 8 for $4.50 your selection. Booklet on our way of growing, 50c. Circular free. Mail order business only. Greenhouse closed. **R. G. BAXTER, Box 1444, Youngstown, Ohio.**

AFRICAN VIOLETS—Over 65 varieties, new and old favorites. FREE DESCRIPTIVE CATALOG, listing our FAMOUS FREE OFFERS, MODERN ORNAMENTAL PLANTS, etc. **VIRGINIA LEE GARDENS, Dept. O, Greensboro, Maryland.**

NURSERY STOCK

DEPENDABLE FRUIT AND NUT TREES, Small Fruits, Ornamentals, and General Nursery Stock. Write for Free Color Catalogue. **CUMBERLAND VALLEY NURSERIES, Inc., Box 114, McMinnville, Tennessee.**

BABY EVERGREENS — SEEDLINGS — TRANSPLANTS — SEEDS. Azalea-Rhododendron Hybrids. All Northern-grown. Bulbs. Free Catalogue. **GIRARD BROS. NURSERY, Geneva, Ohio.**

BOOKS

GARDEN EXCHANGE MAGAZINE—That "biggest little" publication that features EXCHANGE! You'll like this. Sample 10c. One year, $1.00 (Monthly). **E. JOHNSON, 683 Nevada, Reno, Nevada.**

SECRETS OF SUCCESSFUL PROPAGATION METHOD OLD AND NEW. 54 pages, 307 fine illustrations. Grafting. Budding. Cuttings. Seeding. Glass house. Nursery. Garden. 142 pages of articles. Tropical. Subtropical. Northern plants. Fruit. Nuts. Vine. Bulbs. Perennials. Ornamental trees. Cactus. Succulents. Begonias. $3.00. **A. A. LONGMIRE, R 1, Box 36, Carpinteria, Cal.**

GARDEN EQUIPMENT

DELIGHT. PLEASURE. Fulfillment of gardening dreams. You win at every turn with our incomparable weeding tools —three of them that make you king on your plot of ground. FREE: Circular on tools and 8 page discussion of weeds and weeding. Write **KRAMER COMPANY, Dept. 15, Enumclaw, Washington.**

EARTHWORMS

EARTHWORMS—Famous Oliver Barrett strain. Enrich your soil. Marvelous for flowers, Vegetables, Grass. Grow your own. It's easy. Increase rapidly. Circular. Prices on request. **ACCOMAC ORGANIC GARDENS, Accomac, Virginia.**

HYBRID BREEDER EARTHWORMS: Raise Earthworms by the millions for reconditioning soil. Culture instructions included with all orders. Payable in advance. 250 $2.25, 500 $4.25, 1000 $7.00, 5000 and over $6.00 per thousand delivered. **BREMER'S EARTHWORM HATCHERY, Box 652, La Grange, Texas.**

"HARNESSING THE EARTHWORM." Life story of the author, "An Earthworm Turned His Life," mailed free. Write **DR. THOS. J. BARRETT, Dept. 24, Sun Valley, Calif.**

SOILUTION EARTHWORMS Nature's soil builders. Capsules baby worms and breeders. Special 400 egg capsules $5.00. Free folder. **BELOIT EARTHWORM FARM, 1154 Johnson St., Beloit, Wisconsin.**

"EARTHWORM NEWS" and **"PROPAGATION, USE"** PRACTICAL, INFORMATIVE pamphlets given customers with shipment of large "Starter" California (Oliver) worms, $1.25; ½ gal. 400 culture, $2.50; gal. 1,500 $8.50, prepaid, promptly. Starting with the right kind, our system, assures success. Saves you money, time. Order now. Circulars. **R. A. CALDWELL, Barwick, Georgia.**

Our GROWPLANT EARTHWORMS are the superior domesticated variety developed by Geo. S. Oliver. Hand picked mature worms shipped prepaid. 100—$1.25, 500—$4.25, 1000—$8.25, 1800—$14.25. Plus 2½% tax in Calif. **CALIFORNIA EARTHWORM FARMS, Box 4, San Marino, Calif.**

GARDENERS—Would you like to know of the EXCITING **OFFER** now being made by Capital Earthworm Farm? It will pay you to investigate this offer immediately. WRITE NOW! **CAPITAL EARTHWORM FARM, 2514 Fourth Street, South, Arlington, Virginia (CH 4121).**

EARTHWORMS. Save on Fertilizer cost. Follow Nature's Way. For Soil Building and Better Composting. Write for descriptive folder. **COOLVILLE EARTHWORM FARM, Coolville 2, Ohio.**

SELL EARTHWORMS for soil fertility and for profit. We ship under your name if desired. Particulars free. **EARTHWORMS FARMS CO., 6220 Ridgeview Avenue, Baltimore, 6, Maryland.**

Order EARTHWORMS NOW. Nature's fertilizer for building good soil 100-$1, 250-$2.00, 500-$4.00. Free information and culture. **EDMONDSON HATCHERY, 118 Mirabeau, Greenfield, Ohio.**

NEW ENGLAND ACCLIMATED Soilution Earthworms. Selection of egg capsules, baby worms, and breeders; pint $1.75 postpaid. Instructions with each order. **GRANITE STATE EARTHWORM HATCHERY, 491 Hall Street, Manchester, N. H.**

BETTER COMPOST, better soil, better growing conditions are obtained by using our scientifically bred soilution earthworms. Write for free folder. **GREENFIELD WORM HATCHERY, 15703 Biltmore, Detroit, 27, Michigan.**

HORN O'PLENTY HYBRID EARTHWORMS—If you would like a lush, beautiful garden—try our earthworms and culture, for house plants, window boxes, lawns and gardens. 1000 or less $1.25 per hundred. Shipped in culture. The perfect plant food. Complete price list upon request. **HORN O'PLENTY EARTHWORM HATCHERY, Box 2867, Rocky River 16, Ohio.**

FOR DOMESTICATED EARTHWORMS to build your garbage and waste materials into organic rich soil call or write **Mrs. L. JONES, 1515 E. 76th, Seattle, 5, Wash.**

GARDENERS, FISHERMEN. RAISE HYBRID EARTHWORMS. 1,000 or less, $1.00 per 100. Shipment Prepaid. Our aim; Satisfied Customers. Complete Prices and Instructions Free. **KEYSTONE EARTHWORM HATCHERY, 15 North 30th St., Harrisburg, Penna.**

RED WIGGLERS hand picked—1000 $5.00, 3000 $14.00, 5000 and over $4.50 per 1000. Canada add 50c per 1000. Prompt prepaid shipments payable in advance. **LAMBERT WORM RANCH, 2751 Poplar St., Memphis, Tenn.**

LaROY EARTHWORMS. Properly-bred; properly-fed; properly-raised. Rebuild worn-out soil. Write for price list and information. **C. E. LaROY, Route No. 3, Decatur, Georgia.**

LOUISIANA EARTHWORM Farm Boxes 600 earthworms, capsules and castings $6.00. Also 300 of same $3.00. Payable in advance. Full directions included. Parcel Post Prepaid. **W. L. NEIL, Star Route, Vandervoort, Arkansas.**

"SOILMASTER EARTHWORMS" produce humus for better gardens, flowers, lawns. Bait. Prices you can afford to pay. Write **R. H. McNEAL, Box 110, La Junta, Colorado.**

EARTHWORMS—Use that famous earthworm developed by the late Dr. Oliver. Herbert Clarence White, writer for Organic Gardening, swears by them. Write for folder. **MIAMI VALLEY EARTHWORM FARM, 109 E. Beechwood Ave., Dayton 5, Ohio.**

Famous SOILUTION Domesticated EARTHWORMS for soil building, fish bait and poultry tonic. Hand selected, 500—$5.00, 200—$2.00. Complete instructions. **NATURE'S SOIL BUILDERS, 1544 Spring Garden, Lakewood, 7, Ohio.**

ENGLISH MANURE WORMS: fast breeders, Convert green manure, garbage, etc., directly to Humus. No composting necessary. Free pamphlet tells story. 1000—$4.00, 400—$2.00. **PHILLIPS WORM FARM, Box 22, Bessemer, Alabama.**

EARTHWORMS 1000 for $8.00 Prepaid. **PRICE EARTHWORM HATCHERY, Box 348, Rt. 10, Tulsa, Okla.**

TOPSOILER EARTHWORMS. Dr. Oliver's Hybrids. Creators of natural humus. Earthworms build topsoil. The more "TOPSOILERS", the greater soil fertility. Free folder. **TOPSOILERS, 13243 Mark Twain, Detroit 27, Michigan.**

PROPER BALANCE MAKES PERFECT RESULTS. Write NOW for information and most unusual 'ONCE A YEAR OFFER'. **VIRGINIA EARTHWORM FARM, Cherry Hill, Route 4, Roanoke, Virginia.**

EARTHWORMS; domesticated hybrids for soil builders, fish bait or commercial propagation. Ask for free literature. **WILLIAMS HATCHERY, 1121 N. W. 51st St., Miami 37, Florida.**

HYBRID EARTHWORMS, for perpetual fertilizer. 500 $4.00, 1,000 $7.00, 2,000 and over $6.00 per thousand, delivered. Culture instructions included. **COLORADO VALLEY WORM RANCH, La Grange, Texas.**

FERTILIZERS—SOIL CONDITIONERS

LAUWERET'S GARDEN STORE, 3280 Monroe Ave., Rochester, N. Y. carries many of the products for making or for preparing compost, advertised in or approved by the Organic Gardening Magazine.

TENNESSEE Finely Ground Natural Phosphate Rock. Small or Large Quantities. **H. R. LeFEVER, Route No. 1, Spring Grove, Penna.**

FOODS

ANTI-INFLATION VALUES in "GOOD HEALTH" Foods—all grown, processed or prepared under **"Bio-Organic"** principles. 1000 **Alfalfa Tablets** for natural minerals..$3. (200 for trial $1.). **Dehydrated Instant Vegetable Broth** (ten vegetables) $1. **Insta'Churt** (for making **Instant** sour milk)—32 cups size $1. Just add to milk. **Kelp Tablets,** 1000..$2. **Yeast and Kelp Tablets** for Natural "B" Complex, food iodine..1000..$2.95 (100 for trial $1.). Send for list of other dehydrated foods such as: **Dehydrated Molasses**—rich in natural food iron..20 oz. Jar..$1. **Dehydrated Sweet Buttermilk**—just add a tablespoonful to a cup of water—rich in food calcium and non-fattening..10 oz. Jar $1. 5 lbs. bulk $3.75. **Buttermilk Whey Powder**—changes intestinal floras, suppresses colonic putrefaction, mildly laxative..15 oz. Jar $1..5 lbs. $3.75. **Use these protective foods generously. They are good for young and old.** All postpaid. **BIO-DIVISION, Box 98, Linwood Sta., Detroit (6), Mich.**

300 DAYS' SUPPLY OF KELP only $1.00. Iodine is an essential mineral. One BILDINE Pacific kelp tablet daily supplies .3 mg. Iodine in natural form, prevents Iodine deficiency at low cost. 300 BILDINE tablets, $1. 700 for $2. **FOOD SUPPLEMENT CO., Box 615, Williamsport, Pa.**

SHELLED ALMONDS: large, select, Nonpareil, 5 lbs. $4.95 postpaid. **Natural Dates:** unsprayed, case of 18 14 oz. boxes $5.40, express collect. **S. H. JAFFE, Rt. 2, Box 674, Lakeside, Calif.**

HONEY (Primeval) Finest you ever tasted, or money refunded immediately. Primevally gathered by our bees in woods and wilds, where no chemicals are used. Primeval Wild Flower, or Wild Buckwheat Honey: 5 lb. Can $1.85; 12 lb. Can $4.25; also finest Clover Honey, same price. Comb Honey (Clover): 3 sections $2.50; 6 sections $4.75. All prepaid 3d. zone against check, C.O.D. plus postage. **SMITHTOWN BEE FARM, Turnpike, Smithtown, N. Y.**

SEEDS & PLANTS

CERTIFIED VEGETABLE PLANTS. Flat Dutch, Golden Acre, Danish Ballhead, Allseason, Copenhagen, Penn State Cabbage plants 300—$1.25; 500—$1.65; 1000—$2.00. Red beets, Broccoli, Brussel Sprouts, Bermuda and Spanish Onion, Lettuce and Kale plants 300—$1.35; 500—$1.75; 1000—$2.25. Cauliflower and Cauliflower Wonder Pepper plant 500—$2.50; 1000—$3.95. Rutger, Margelobe Tomato 500—$2.00; 1000—$3.00. Special price on large quantity. All plants by 100—$1.00. **A. WILEY McDONALD, New Freedom, Pa.**

MONEY MAKING ACTIVITIES

FREE BOOK "372 Unusual Worldwide Businesses." Australia, South America, New Zealand! $800 month reported. Work delightful enterprises home. Prepare for surprise! **PUBLISHERS-ZI, Carlsbad, Calif.**

IRISH WOOLENS

TWEEDS: when you doff your dungarees, don **Irish Tweeds from Avoca Handweavers,** tops for color, durability. Blankets all sizes, weights. Upholstery, curtaining. Order now for fall. **CAROL BROWN, Putney, Vermont,** imports them direct.

HAMSTERS

GOLDEN HAMSTERS. The new wonder animals from Syria. Delightful pets. Thousands needed by laboratories. Clean, odorless. Can be raised anywhere. Most prolific. Make money, get started now. Write today for big free picture book. Full of success stories of breeders throughout the country. **GULF HAMSTERY, 1610 Basil, Mobile, Ala.**

BUSINESS OPPORTUNITIES

MELBOURNE VILLAGE invites investigation by young parents who prize these things: The family-centered activities of productive homes; participation in the democratic group life of a carefully planned community; the health advantages of year-round sunshine, outdoor living and organically grown fresh fruits and vegetables, plus systematic health education. Variety of new cash income opportunities opening up with the reactivation, on a permanent basis, of the nearby Banana River Base. (Civil service employees take especial notice.) The Village is growing rapidly; now includes members from 24 states. Direct inquiries to **AMERICAN HOMESTEADING FOUNDATION, Box 696, Melbourne, Florida.**

WOULD you pay 3% first $350 made? Color illustrated book "505 Odd, Successful Enterprises" free. Work home. Expect something odd. **PACIFIC, Oceanside, Calif.**

GOLDEN HAMSTERS Raise our new "LIVE-GOLD STRAIN" HAMSTERS. Written guarantee to buy the young, given with breeding stock purchased from us. **FREE** information and picture. **THE HAYNER HAMSTERY, Dept. 27, West Salem, Ill.**

DISTRIBUTE SUBSCRIPTION-GETTING BOOKLETS. Help spread the organic message. Nothing to sell. Merely hand out these booklets to likely subscriber prospects of **Organic Gardening Magazine.** Coded coupon permits us to trace source of subscription to your efforts. Liberal commission. **See page 17 for complete story.**

REAL ESTATE FOR SALE

ORGANIC ACRE in beautiful Rogers, Arkansas, home, abundant shade, all conveniences, near spring-fed lake, schools, stores, employment; priced reasonable. Write for description. **L. B. KIMBRELL, 217 W. Locust, Rogers, Arkansas.**

ORGANICULTURED ten acres without chemicals over 23 years. Bearing fruits, nuts. Six rooms furnished, $9,800 cash. **RICHARD PENDER, Brandon, Florida.**

MISCELLANEOUS

CESSPOOLS, SEPTIC TANKS and clogged drains can be corrected by applying "Sursolvent". These chemicals liquefy forms of organic matter and remove particles in the subsoil which cause flooding and overflowing. No pumping required. Comes in 100 lb. steel drums. Write for descriptive literature. **ELECTRIC SEWER CLEANING CO., Allston, Mass.**

BE YOUR OWN WEATHER MAN! This perfect reproduction of original Clipper Ship Weather Glass will warn you of approaching storms. Glass entirely hand made. No two alike. Useful and attractive. $2.50 postpaid. Satisfaction guaranteed. Or send for illustration. **LEVITT PRODUCTS, Box 718, Woodmere, L. I., N. Y.**

HAMSTERS $2.75 pair. Mice $3.50 dozen. Alligator $2.50. Chameleon 35c. Turtle 35c. Mealworms 50c hundred Hobby catalog 10c. Reptile List 5c. **QUIVIRA SPECIALTIES, Topeka, Kansas.**

HELP WANTED

ORGANIC GARDENER interested in commercial production of perennials to share business. Some capital necessary. Greenhouse and 14 acres of best land in Connecticut. Write to **Mrs. GEORGE T. CHARLTON, Mt. Carmel, Connecticut.**

WANTED—A college or university trained agronomist for position as Associate Editor of ORGANIC FARMER Magazine. Write to **ORGANIC GARDENING, Publishers, Emmaus, Pa.**

POSITION WANTED

NEAT MARRIED YOUNG MAN with farm experience, desires partnership or salary with Organic Farmer. Good living quarters a prerequisite. **Mr. WILLIAM FEETHAM, Rt. I, Box 142, Toppenish, Wash.**

If you wish to buy or sell organically-grown foods send advertising copy to Organic Gardening, Emmaus, Pa. The purpose of the Trading Post is to bring together the buyer and seller of organically-grown food products. Rates are 21c a word. Minimum 25 words, or $5.25. Payable in advance. Include name and address in word count.

SODUS PURPLE RASPBERRIES Organically grown, vine ripened, fresh picked, home packed. Also large Latham Red. Prepare for deep freezing or canning now and enjoy this delicious fruit next winter. Crate of 12 pints $5.80, express collect. **MARYKNOLL RANCH, RFD 1, Lake Geneva, Wisconsin.**

SUNFLOWER SEED—Organically grown. 65 cents a pound. 70 cents a pound west of the Mississippi. **RODALE PRESS, Emmaus, Pa.**

Books for Organic Gardeners

Memoirs of a Rose Man

by J. Horace McFarland

Contains the horticultural ideas and personal reminiscences of America's greatest champion of the rose. Preface by L. H. Bailey, introduction by R. C. Allen, biographical sketch by Robert Rodale. Cloth, 160 pp., many full-page photos. **$3.00.**

•

Trees and Toadstools

by M. C. Rayner, D.Sc.

Deals with the fundamental but little understood relationship between the toadstools which grow in the forest floor and the giant trees which tower high over the other woodland plants. Cloth, 122 pp., 18 full-page photographs. **$2.50.**

•

The Earth's Face and Human Destiny

by Dr. Ehrenfried Pfeiffer

A beautiful landscape is an index of a living soil which has not been exposed to bad agricultural practices. The author warns his readers against measures which surely lead to the deterioration of our fertile soils. Cloth, 183 pp., 60 illus. Frontispiece in color. **$2.75.**

•

The Soil and Health

by Sir Albert Howard, C.I.E.

Food problems can be solved only by restoring to the soil its virginal fertility. Man has been and still is an exploiter, and most farmers are soil bandits. A remarkable follow-up to "An Agricultural Testament". Cloth, 320 pp. **$4.00.**

•

Bio-Dynamic Farming and Gardening

by Dr. Ehrenfried Pfeiffer

Describes in full the bio-dynamic methods for converting an ordinary farm into a bio-dynamic farm. Paper, 240 pp., 18 illus. **$1.75.**

•

The Compost Gardener

by F. C. King

An English gardener explains his system of organic gardening. Foreword by Sir Albert Howard. **$1.00.**

An Agricultural Testament

by Sir Albert Howard, C.I.E.

The standard textbook for gardeners and farmers who want to change from ordinary chemicals to home-made organic fertilizer. Cloth, 253 pp. **$3.50.**

•

Grow a Garden

by Dr. Ehrenfried Pfeiffer

A goldmine of information for growing each vegetable from the bio-dynamic point of view. Paper, 118 pp. **$1.40**

•

The Pruning Book

by Gustave L. Wittrock

This is definitely a book for the home gardener, an expert tree pruner always by your side. It deals with all kinds of shrubs and trees, tells not only *how* to prune, but *when*. Cloth, 166 pp. **$3.00**

•

The Earth's Green Carpet

by Louise E. Howard

Lady Howard, widow of Sir Albert Howard, shows that degenerative diseases are on the increase as a result of soil depletion by artificial chemical fertilizers. She stresses that Man's health and happiness depend upon the use he makes of "the earth's green carpet." Cloth, 260 pp. **$3.00.**

•

Farmers of Forty Centuries

by F. H. King

Dr. King takes his readers into the fields of Japan and China to observe at first hand the agricultural practices which enabled those peoples to maintain their soils in a highly productive condition over a period of forty centuries. Cloth, 384 pp., 209 photographs. **$5.00.**

•

BINDERS for either Organic Gardening Booklets or Organic Gardening Magazines

Each holds 12 books. Copies are easily removed or inserted. IMPORTANT. When ordering, state whether for Organic Gardening Booklets or *Organic Gardening Magazine*. **$1.85.**

Order from* ORGANIC GARDENING, Dept. OG 7-A, *Emmaus, Pa.

The Trend is THE ORGANIC WAY

These Organic Gardening Booklets show you the *Why* and H

1.—**THE DOCTORS' ATTITUDE TOWARD FERTILIZERS.** This book reports upon the attitude of doctors toward the organic method. Contains a transcript from a U. S. Senate Hearing of important testimony given by Dr. Max Gerson on his cancer cure by diet. 60c

2.—**MANUAL OF ORGANIC MATERIALS. A Comprehensive List of Compostable Materials Occurring in the Home and in Industry.** This book alphabetically lists 85 substances that may be used to keep the soil fertile in Nature's way. It defines the composition of each material and what each substance contributes in plant nutrients to the soil. 50c

3.—**BULBS AND HOUSE PLANTS** by Cecile Hulse Matschat. Discusses tulips, iris, lilies, peonies, etc. 60c

4.—**ANNUALS AND PERENNIALS** by Cecile Hulse Matschat. Describes the advantages of annuals over perennials and vice-versa. 60c

5.—**HOUSE AND GREENHOUSE GARDENING** by Fred McReady. Deals with inexpensive means for growing plants in your house and under glass in hot-beds and greenhouses. $1.00

6.—**GARDENING WITH THE EXPERTS** by Garden Experts. An encyclopedia on all phases of gardening. $1.00

7.—**THE WAR IN THE SOIL** by Sir Albert Howard, C.I.E., M.A. A magnificent summary of the organic cause for those who desire to change from ordinary to home-made organic fertilizer. . . . 80c

8.—**SEEDLINGS** by Evelyn Speiden. How to start seedlings—how to prepare the garden. . . $1.00

9.—**VEST-POCKET VEGETABLE GUIDE** by Roger W. Smith. How to grow 40 vegetables in the organic manner—for medium northern climate. . 25c

10.—**COMPLETE MODERN GARDEN HERBAL** by Robert O. Barlow. Many facts about herb gardening and usage in several lands. $1.00

11.—**THE FRUIT ORCHARD** edited by J. I. Rodale. Practical hints, unusual data on fruit growing. 50c

12.—**LEAVES AND WHAT THEY DO** by Heinrich Meyer. Deals with the leaf's importance to the gardener and lover of plants. 45c

13.—**SUNFLOWER SEED—THE MIRACLE FOOD** by J. I. Rodale. Treatise on how to grow, how to eat this vitamin-rich food. 50c

14.—**WEEDS AND WHAT THEY TELL** by Ehrenfried Pfeiffer. Discusses hundreds of weeds common to farm, orchard and garden. $1.00

15.—**SHRUBS AND TREES** by Cecile Hulse Matschat. This book discusses landscape design, shrubs suitable for borders and backgrounds, low-growing and high-growing shrubs, street trees, windbreaks, flowering trees, fruit trees, evergreens, etc. Illustrated. 60c

16.—**HOW TO MAKE A GARDEN** by Cecile Hulse Matschat. Here are all the facts and underlying principles which go to make any garden a success. Illustrated. 65c

17.—**PLANNING THE HOME GROUNDS** by Cecile Hulse Matschat. Whether you buy or build . . . remodel or start from the ground up, this book will help you develop your grounds into a beautiful setting for your home. 65c

18.—**HOUSE PLANTS—How To Grow Them** by P. T. Barnes. A complete guide for growing healthy, vigorous plants in the house. . . 50c

19.—**TEN TRUSTWORTHY TROPICAL TREES** by C. Gifford. A delightful book. Includes the coconut, guava, avocado and mango. . . .

20.—**WILD GARDENS OF NEW ENGLAND** by Prichard Eaton. How to reproduce the settings of lovely, wild flowers in your garden.

21.—**GARDENING FOR PROFIT** by Peter Originally published in 1874. Reveals many secrets that present-day gardeners will find and useful. . . . . .

22.—**QUICK-RETURN METHOD OF COMPOST-** by Maye E. Bruce. New ideas for producing WITH OR WITHOUT animal manure. .

23.—**TREE CROPS** by J. Russell Smith. An book on crop-yielding trees—their crops as food. . . . . .

24.—**EDIBLE PLANTS OF THE POND AND GARDEN** by G. L. Wittrock. A wonderful tor for the nature-lover and fisherman.

25.—**THE FORMATION OF VEGETABLE THROUGH THE ACTION OF WORMS** by Darwin. Contains the most important parts of classic on the earthworm, with other articles.

26.—**OUR FRIEND THE EARTHWORM** by Oliver. Deals with the importance of the worm to gardening. Truly a friend to man.

27.—**ANIMALS AND THE GARDENER** by Richard strom. Animals and insects that are friends foes to the garden. . . .

28.—**LUTHER BURBANK** by Roger W. Smith. ing reading about plant breeding and the contributions of this great horticultural pioneer.

29.—**QUESTIONS AND ANSWERS ON COMPOST** by J. I. Rodale and Heinrich Meyer. A compost-making. . . .

30.—**COMPOST—HOW TO MAKE IT** edited by Rodale. The only book of its kind ever published.

31.—**SLEEP AND RHEUMATISM** by J. I. Rodale. plains simple rules for avoiding stubborn neuritis caused by pressures exerted during sleep.

32.—**NATURAL BREAD** edited by J. I. Rodale. health-giving values of breads and cereals organically-produced stone-ground grains.

33.—**DEBATES IN HOUSE OF LORDS.** Deals advisability of forming a Royal Commission on the Sir Albert Howard method of gardening. . . . .

35.—**FLOWERS FOR EVERYONE** by Heinrich Facts about the common plants of the flower

36.—**THE GARDEN NOTEBOOK** by Alfred W. Johnson. Proper methods and practices types of gardening. . . . .

37.—**THE GLADIOLUS BOOK** by William M. about the gladiolus and its culture. . .

38.—**THE BERRY BOOK** by M. B. Cummings, you grow, or intend to grow berries, this worthy of your attention. . .

39.—**FLOWER CALENDAR** by Dr. William H. This calendar tells what to plant and when to Assures a blooming, beautiful garden all year where. . . .

Send your order today direct to ORGANI GARDENING, Emmaus, Penn

Canada and Foreign add 10% Shipping Charges

PURDUE UNIVERSITY LIBRARY
LAFAYETTE IND.